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ABSTRACT

This report addresses the degree to which retraining has met the challenge of ensuring that the American work force has adequate skills to cope with the changing world of work. Chapter 1 sketches economic, social, and technological changes that help explain why the current reactive approach needs to be more active. In chapter 2, the extensiveness of permanent job loss is discussed with particular emphasis on the correlates of prolonged unemployment--lower levels of education and training. Chapter 3 reviews data relevant to the retraining initiatives begun under the Job Training Partnership Act. Chapter 4 deals with the skills and capacities that employers regard as essential now and in the future to allow their employees to maintain and increase productivity and thereby prevent obsolescence. Chapter 5 investigates efforts of employers and institutions to remedy the situation, in terms of educational and training programs and learning opportunities made available to employees. The final chapter summarizes results and discusses critical issues that require attention. Specific suggestions are provided for desirable features of retraining programs and desirable aspects of organizational development. (SK)

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Information Series No. 322

PREVENTING OBSOLESCENCE THROUGH RETRAINING: CONTEXTS, POLICIES, AND PROGRAMS

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FOREWORD

The Educational Resources Information Center Clearinghouse on Adult, Career, and Vocational Education (ERIC/ACVE) is 1 of 16 clearinghouses in a nationwide information system that is funded by the Office of Educational Research and Improvement, U.S. Department of Education. This paper was developed to fulfill one of the functions of the clearinghouse--to interpret the literature in the ERIC database. This paper should be of interest to trainers, counselors, and other practitioners serving dislocated workers as well as to policymakers, administrators, and employers dealing with the issues of job obsolescence and retraining.

The profession is indebted to Jeanne P. Gordus and her colleagues for their scholarship in the preparation of this paper. Dr. Gordus is Associate Research Scientist, Institute of Science and Technology, and Director of the Employment Transition Program at the University of Michigan. She has served as a consultant in the areas of plant closings and reduction in force to such groups as the Statewide Staff Development Institute of Indiana, the U.S. Department of Labor, the United Auto Workers, and the National Institute of Mental Health. Dr. Gordus is the author of *Mental Health and the Economy, Leaving Early: Problems and Perspectives in Current Retirement Policy and Practice, Plant Shutdowns and Economic Dislocation,* and *Economic Change, Physical Illness, Mental Illness, and Social Deviance.*

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Ray D. Ryan
Executive Director
The National Center for Research
in Vocational Education

EXECUTIVE SUMMARY

How well has retraining met the challenge of ensuring that the American work force has adequate skills to cope with the changing world of work? This report examines this question by focusing on the retraining provided to those currently employed and those whose jobs have been lost. The underlying assumptions and problems of the nation's approach to retraining are explored as a basis for determining its effectiveness in preventing obsolescence.

The first chapter sketches economic, social, and technological changes that help explain why the current reactive approach needs to be more active. These changes include falling rates of productivity, wage stagnation, decline in the manufacturing industry, differing composition of the work force, and mechanization in industry.

Data illustrating the extensiveness of permanent job loss from 1979 to 1984 are presented. These data suggest that reemployment prospects are better for white-collar and service workers and for those with a higher level of general education. Relocation, a standard response to displacement in the past, is proving to be an inappropriate answer.

An alternative response is education. The paper examines outcomes of the Downriver Program in Michigan and Job Training Partnership Act Title III programs, which focused on the unemployed. Conclusions drawn from these demonstration projects are that, although skills training may be effective, the probability is much higher that job search skills training will be both effective and cost-effective.

Preventing obsolescence among the currently employed is the subject of the fourth chapter. Research revealing basic skills deficiencies in an alarming proportion of the work force demonstrates that obsolescence--defined as a task-associated deficiency in a job that currently exists--is a serious problem for many employers. The effects of technological change are broader than the simple replacement of humans with machines. Another side of the coin is the introduction of "soft technologies," that is, changes in the process of work to increase productivity by reducing flaws in products and services. Such concepts as the quality of working life and just-in-time inventory systems can resolve productivity problems if relevant training, including basic and critical thinking skills, is part of the process.

The heart of the paper is an exploration of actual workplace situations in which different combinations of worker characteristics, employer needs, and available resources illustrate a number of approaches to retraining and skill improvement. The evidence of these case studies suggests that successful workplace learning centers for basic skills are closely integrated with the job-related experience of the participants, have goals and structure that are determined by the funder and are relevant to organizational goals, and have employee participation that is based on how workers perceive its benefits to themselves and to their jobs.

Finally, the authors summarize some patterns emerging from the discussion and offer some policy recommendations. Specific suggestions are provided for desirable features of retraining programs and desirable aspects of organizational development. They conclude that, although reactive

strategies are a natural response to unemployment problems, there is evidence that human resource issues are closely linked to organizational long-range goals. The linking of corporate goals and education and training provides a strong basis for a proactive, preventive strategy toward skill obsolescence.

Information on retraining and skill obsolescence may be found in the ERIC system using the following descriptors: Adult Education, Business Cycles, *Corporate Education, Demonstration Programs, *Dislocated Workers, Employment Potential, *Inplant Programs, Job Search Methods, Job Skills, *Retraining, *Skill Obsolescence, Structural Unemployment, *Technological Advancement. Asterisks indicate descriptors having particular relevance.

INTRODUCTION

This report addresses the public and private concern that the American work force no longer possesses an adequate supply of skills to cope with an increasingly complex and abstract world of work. Its specific topic is the degree to which retraining has effectively met this challenge. Since the issue of retraining is our foremost concern, the focus of this report is upon retraining provided to two groups, those working and those whose jobs have been lost and who are therefore eligible to participate in publicly funded retraining programs. Since the scope of this inquiry is whether retraining effectively remedies the problem of obsolescence of workers' skills across the economy, and since it is clear that many efforts in this direction are not successful, it is important to understand the underlying assumptions and problems intrinsic to the American approach to retraining.

The first chapter of this report reviews briefly the economic, social, and labor market aspects of past decades and reports on projections of labor market participation, industrial change, and technological shifts anticipated in the near future. The response to work-related educational needs of adults is reviewed, and two approaches--one for those unemployed and one for those currently employed--are identified.

In the second chapter, the extensiveness of permanent job loss in the late 1970s and early 1980s is discussed with particular emphasis upon the correlates of prolonged unemployment--lower levels of education and training. The regional distribution of job loss is discussed in relation to one possible response to permanent dislocation, geographic mobility.

The third section of the report reviews data drawn from a number of sources relevant to the retraining initiatives begun in the early 1980s under the Job Training Partnership Act, a major public commitment to returning to new productive employment large numbers of retrainees who had been dislocated from their previous employment.

The fourth section of this report deals with a larger, yet more obscure subject, the skills and capacities that employers regard as essential now and in the future to allow their employees to maintain and increase productivity in an era where jobs are not only being abolished but are also being transformed by the implementation of new "hard" and "soft" technologies.

The fifth section of the report investigates the efforts of some employers and institutions to remedy the situation, in terms of educational and training programs and learning opportunities made available to employees.

In the final section of the report, the results of the review are summarized and the critical issues that require attention are discussed. Drawing upon the research and evaluations that have been reviewed, several themes are developed and highlighted as significant questions requiring careful and thoughtful consideration. Some recommendations for program and policy development are also made.

THE CHANGING ECONOMIC STRUCTURE AND EDUCATION AND TRAINING ISSUES

In this chapter, the economic, social, and technological changes likely to have relevance for skill requirements are discussed. The historical background as well as the outlook for the near future are included. In addition, a brief sketch of earlier responses to these changes is presented. This background is important because it suggests why the reactive approach to the problems of integrating continuing education and the needs of the workplace, once sufficient to maintain the nation's store of human capital, needs to be replaced by a more active approach. The focus of this chapter, as well as the rest of this volume, is upon adult workers and learners, because only those already skilled can experience skill obsolescence.

The Economic Backdrop

The underlying changes in the American economy normally occur gradually, punctuated by dramatic events. Less memorable are slow historic shifts such as those that can be observed in historic data about worker productivity. From 1947 until 1965, average annual worker productivity was 3.5 percent per year. A more normal historic rate held from 1966 until 1973: 2.5 percent per year. Beginning in 1973 until 1982, the rate of productivity increase fell to 0.8 percent per year. A surge in productivity in the American economy from 1945 until 1973 provided a period of sustained wage growth. After 1973, a period of wage stagnation began. In fact, the gross national product (GNP) continued to grow in the 1970s whereas average wage or worker GNP declined (Berlin and Sum 1986). How this shift was experienced in the wages received by men in the prime earning years, from age 40-50, at different points in time is shown in table 1.

TABLE 1

INCOME GROWTH OF MEN FROM AGE 40 TO AGE 50
(1984 dollars)

Men who were 40 in	Income at 40	Income 10 years later	Percent of change
1949	$12,858	$17,290	34
1959	18,959	24,421	29
1973	28,118	24,098	-14

SOURCE: Levy (1987)

Although it is clear that some of this shift can be traced to the OPEC oil price increase and the consequent transfer of purchasing power abroad to fill energy needs, other factors are also important. During this period, the service sector continued to grow. At the same time, manufacturing employment continued to decline. For example, from 1975 to 1981, about 13,000 plants employing 2.2 million workers applied for Trade Adjustment Assistance (Barth and Reisner 1981). Since this figure represents only manufacturing industries that could be considered trade-impacted, many other facilities affected by other factors were closing as well. The industrial sector employed about 30 percent of the work force in 1984; only 11-12 percent of the employment in the 1990s is expected to be in industry (Charner and Rolzinski 1987). Partly because of the decline in the real wage rate and partly because the industrial jobs lost paid more than the service jobs newly created, more and more American families feature two workers. This shift provokes another. Services once provided within the one-worker household--for example, child care, food preparation, and home repair--are now purchased.

Social and Demographic Factors

The number of young adults has declined since 1980 and will continue to decline until the mid-1990s, creating a shortage of applicants for entry-level positions. At the same time, the baby boom, a cohort that suffered in its labor market experience due to its large size, will be crowded into midlevel positions from which there is no upward mobility since the number of competitors is so large. The continuing entry of women into the labor force is estimated to account for 65 percent of all new hires in the next decade. At the same time the black and Hispanic population of the country will continue to increase, with the two groups expected to account for 25 percent of the work force in 1990 (Charner and Rolzinski 1987).

Because many of those displaced by the decline of the industrial sector, either because of foreign competition or because of automation, have low levels of skills, a large number of formerly affluent blue-collar workers will work for little more than half their former industrial wage rate in the service sector's low-skilled, low-paid jobs (Bluestone and Harrison 1982).

Technological Advances

Continuing mechanization has been a prominent feature of the workplace since the Industrial Revolution. Until recently, agriculture and mining were the major industries where technology had drastically reduced employment while maintaining and increasing production. More recently, however, manufacturing, which had not been particularly technologically innovative, has begun a major transformation. The new computer-based technologies already have the potential of altering beyond recognition basic manufacturing as well as most of the service industries. The rapidity and the extensiveness of this potential technological change is enormous, ranging from auto manufacturing to banking, insurance, and health care industries.

Previous Responses to Adult Career Needs

Midcareer job loss and programs developed to respond to the unemployment situation have been relatively unexplored areas of research and evaluation until recently. In 1962, concern over automation and the impending job loss for skilled workers who could not be reabsorbed into the economy was a major factor in passage of the Manpower Development and Training Act. That employment and training initiative and its successor program, the Comprehensive Employment and Training Act (CETA) (1973-1981), are estimated to have cost some $80 billion. It is also estimated that

less than 1 percent of these funds was expended to assist those whose jobs had been lost to automation since they were, contrary to early expectations, reabsorbed into the labor force (Ginzberg 1982). In the 1960s, a demonstration project, ranging over several years, did attempt a variety of responses to automation-associated job loss in the meatpacking industry (Shultz and Weber 1966). However, the major concerns at that time were not directed toward adults who were employed, or even to involuntarily unemployed, though job-ready adults, but to various disadvantaged groups. In part, this lack of concern was justified since the general level of education of new labor market entrants had continued to rise, from 10.3 years of education for labor market entrants in 1940 to 12.9 years for a similar cadre in 1980 (Ginzberg 1983). Moreover, it was known, although not carefully documented, that a great deal of education and training in specific skills took place on the job. The persistence of high levels of unemployment among the younger, less educated members of the work force was the major focus. Indeed, that problem continues, although others have surfaced as well.

Recent Developments

The recession of the late 1970s and early 1980s was experienced as particularly severe in areas of the country where heavy industry was concentrated. Detroit, the Mahoning Valley, Pittsburgh, Flint, and Pontiac, once meccas for those displaced from the automating agricultural and mining industries of the South, became centers of the "new unemployment," sometimes exceeding 20 percent. Unlike in the 1950s, when those displaced from mining and farming needed only to travel for a few days to find jobs in steel mills and auto factories (Halle 1984), no such geographic solution was available during the recent recession, as many desperate travelers to Houston and Dallas in 1982 discovered. Occupational shifts were required, and for this change, training, not travel, was thought to be the solution.

One response to this situation was developed in the context of worker dislocation as programs were developed to assist job losers in making the transition to new careers. A less obvious set of responses, begun within workplaces in a variety of settings and arrangements and already underway in some cases, was developed further as new workplace challenges became apparent.

The following chapters review the extent of worker dislocation and some identified skill and education deficiencies of those dislocated. Programs addressing those issues are described and reviewed. A similar assessment of the needs of those currently employed is made, followed by case study data providing some detail about the integration of skills attainment and personal development in the workplace. Some general conclusions and recommendations based upon the reviews are presented.

EXTENSIVENESS AND CONSEQUENCES OF PERMANENT DISPLACEMENT

In this chapter, data from several sources are presented to show the extensiveness of permanent job loss from 1979 until 1984, the period for which national data are available. In this section, particular attention is given to the duration of job loss by occupational groups and the correlates of extended unemployment.

As recently as 1980, attempts to estimate the extensiveness of permanent job loss were extremely difficult. Bluestone and Harrison (1980), for example, used the National Longitudinal Survey for one estimate. A major advance in research in this area was made when the Bureau of Labor Statistics added 18 questions to its Current Population Survey (CPS) in January 1984. Not only is this the first representative sample of individuals displaced from the work force, but the criteria for identifying potentially displaced workers were explicit. Individuals responding "yes" to the question about job loss from 1979 to 1984 because of a plant closing, an employer going out of business, or a layoff from which a worker was not recalled were asked the additional questions. Data from this survey were presented by Devens (1986), and recently, analyses by Podgursky and Swaim (1987) have added to our knowledge. In the period 1979-1984, about 5.8 million blue-collar workers were displaced. At the time of the CPS, 60.7 percent were reemployed, 29.2 percent were unemployed, and 10.2 percent had left the labor force. About 3.8 million white-collar workers were displaced during the same period. Data drawn from the Podgursky and Swaim study for blue-collar and white-collar workers are shown in tables 2A and 2B. These data indicate that not only are proportionately fewer white-collar and service workers displaced, but also that their reemployment prospects in general appear to be better, an expected finding.

In table 3, several important distributions are shown for blue-collar and white-collar workers: age, duration of joblessness, and a ratio of current earnings to adjusted former earnings. The median weeks of unemployment for blue-collar workers are 26 weeks, in contrast with 10.4 weeks for white-collar workers.

Among the most important findings in this research was the factor associated with both higher likelihood of reemployment and reduced earnings losses: a higher level of general education. Higher investment in specific training, such as on-the-job training, was not similarly protective of those displaced. Further, Podgursky and Swaim suggest that general education and remedial programs should be targeted to groups with educational problems, to women, and to minorities. Finally, it is suggested that prompt adjustment assistance may be important if, as is suggested by the data, protracted unemployment appears to be associated with even greater difficulty in reentering the labor force.

As noted earlier, the standard solution to displacement in the past had been relocation, a response used differently by different groups. For many white-collar workers, it had been the choice of first resort, since professional associations are helpful in searching for jobs and transcending narrow geographic boundaries. White-collar workers possess good communication skills as well as portable technical skills. Blue-collar workers, in contrast, tend to resist relocation, even when it is offered as part of a collectively bargained program of job security (Lipsky

TABLE 2A

NONAGRICULTURAL BLUE-COLLAR WORKERS DISPLACED FROM FULL-TIME JOBS BETWEEN JANUARY 1979 AND JANUARY 1984[a]
(thousands of workers)

Labor Force Total (January 1984)	Blue-Collar		
	Total	Male	Female
Total	5,777	4,438	1,339
(Percent of total)	(100)	(100)	(100)
Employed	3,505	2,835	670
	(60.7)	(64.3)	(50.0)
Unemployed	1,685	1,319	366
	(29.2)	(29.7)	(27.4)
Not in labor force	587	284	303
	(10.2)	(6.4)	(22.6)

TABLE 2B

NONAGRICULTURAL WHITE-COLLAR WORKERS DISPLACED FROM FULL-TIME JOBS BETWEEN JANUARY 1979 AND JANUARY 1984[a]
(thousands of workers)

Labor Force Total (January 1984)	Blue-Collar		
	Total	Male	Female
Total	3,769	1,909	1,860
(Percent of total)	(100)	(100)	(100)
Employed	2,582	1,433	1,149
	(68.5)	(75.0)	(61.8)
Unemployed	735	386	349
	(19.5)	(20.2)	(18.8)
Not in labor force	435	91	362
	(12.0)	(4.8)	(19.5)

SOURCE: Adapted from Podgursky and Swaim (1987)

[a] Workers between the ages of 20 and 61 in January 1984. Totals also exclude a small number of workers previously employed as private household workers. Components may not sum to total due to rounding error.

TABLE 3

MEDIAN AGE, REEMPLOYMENT RATE, AND MEDIAN RATIO OF CURRENT TO ADJUSTED FORMER EARNINGS BY WEEKS OF JOBLESSNESS[a]

Weeks of joblessness	Male			Female		
	Percent of sample	Age[b]	Percent Reemployed January 1984[c]	Percent of sample	Age[b]	Percent Reemployed January 1984[c]
Blue-collar						
0 weeks	9.5	31.8	89.1	6.7	37.4	83.7
1-14	28.9	28.3	86.6	19.9	31.6	79.2
15-26	14.1	28.7	80.5	14.1	26.9	75.9
27-52	16.7	30.9	81.0	21.2	32.2	71.0
53-98	9.5	28.6	75.3	4.7	36.5	61.4
99 or more	21.4	31.9	32.0	33.4	32.5	27.5
Median weeks	26.0	-	-	40.4	-	-
White-collar and service						
0 weeks	18.0	34.1	93.7	12.6	32.1	81.0
1-14	40.5	31.2	90.2	34.5	27.8	82.1
15-26	13.0	31.9	89.8	11.5	30.5	77.3
27-52	14.8	31.3	88.7	13.7	30.3	73.8
53-98	3.7	37.9	79.7	6.6	32.7	61.6
99 or more	10.1	37.0	19.0	21.0	36.2	30.0
Median weeks	10.4	-	-	19.6	-	-

SOURCE: Adapted from Podgursky and Swaim (1987)

a Workers aged 20-61 formerly employed in full-time nonagricultural wage and salary jobs who were displaced due to a plant shutdown, business failure, or relocation; or those whose employers remained in operation but who were displaced due to slack or whose jobs were otherwise eliminated. Tabulations also exclude a small number of workers formerly employed as private household workers.

b Median age at the time of displacement.

c For workers employed in January 1984, ratio of usual weekly earnings on current job to usual weekly earnings on former job, adjusted for trend growth of hourly earnings between the year of displacement and January 1984, using the Employment Cost Index for wages and salaries.

1970). During the recession of 1979-83, relocation for many, particularly blue-collar workers, became an even less attractive strategy since the permanent displacement was distributed across the regions of the country. Data taken from a General Accounting Office report (1986) are shown in table 4.

Since geographic mobility was no longer an appropriate answer from any perspective, the response of choice to worker dislocation became an educational response. How the Job Training Partnership Act, during its demonstration and implementation phases, worked as a training strategy to assist in worker reemployment and the prevention of the obsolescence of worker skills is the topic of the next chapter.

TABLE 4

REGIONAL DIFFERENCES IN PERMANENT JOB LOSS

Region	Number of establishments[a]	Percent of total	Rate of occurrence	Number of job losers	Percent of total
Total	7,790	100	7.8	1,049,000	100
Northeast	2,880	24	7.6	227,000	22
New England	640	8	9.3	80,000	8
Mid Atlantic	1,240	16	6.9	147,000	14
Midwest	2,190	28	9.0	312,000	29
East North Central	1,690	22	9.6	227,000	21
West North Central	500	6	7.4	85,000	8
South	2,460	32	7.5	299,000	29
South Atlantic	850	11	5.2	76,000	7
East South Central	310	4	5.5	48,000	5
West South Central	1,300	17	12.0	175,000	17
West	1,260	16	7.0	211,000	
Mountain	320	4	7.2	36,000	
Pacific	940	12	6.9	175,000	

SOURCE: General Accounting Office (1986)

[a]Establishments with 100 or more employees.

REVIEWING RETRAINING FOR UNEMPLOYED ADULTS

In order to develop a public policy response to the rising unemployment of midcareer adults, the U.S. Department of Labor funded a demonstration project to ascertain whether a well-planned, developed, and administered program could make a significant difference in terms of reemployment and post-program wage rates for those laid off as a result of plant closings and massive layoffs in durable goods manufacturing.

Demonstration Programs and Evaluations

The Downriver Community Conference, a coalition of 17 communities adjacent to Detroit, Michigan, had existed for several years as a basis for economic development and employment and training programs. A comprehensive model Economic Readjustment Assistance (ERA) program was developed and has generally been called by the name of the sponsoring agency, the Downriver Program. An evaluation component utilizing a nonequivalent control group design was developed in 1981 to measure the impact of the program and to document program development and outcome for later replication.

There were two phases in the Downriver program, an early phase that included workers from the BASF and Dana Corporation closings and a later phase that included, among others, workers from the Michigan Casting plant of the Ford Motor Company's River Rouge Complex.

In their report, Kulik, Smith, and Stromsdorfer (1984) described the comprehensive nature of the services, organization, and management of the program. Every participant who was enrolled was put through an assessment process as well as a workshop designed to provide career guidance, training information, and job search assistance. After this entry phase, program staff performed a kind of triage based upon information garnered about participants and made assignments to specific program elements. In all, the program served approximately 2,100 workers laid off from firms serving the auto industry.

In the early phase, the evaluation showed a large and significant impact on the reemployment rate of one group of the participants, increasing the probability of employment by 20 percent. Weekly earnings were also increased by an average of $77 per week over nonparticipants. The other group of early participants experienced similar outcomes, with reemployment rates increased by 13 percent and the same average earnings increase of $77 per week over nonparticipants.

In the second phase, however, program outcomes were much less positive. The program decreased reemployment rates and had no effect on earnings. In the time between the first and second phases of the program, the local unemployment rate increased from 12 to 20 percent, which might explain the change in outcomes. Unmeasured differences between participants and nonparticipants might also have been a factor.

Three tables taken from Kulik, Smith, and Stromsdorfer's (1984) report are provided. The first, table 5, shows the distribution of participants and services and includes details about the

TABLE 5

PROGRAM SERVICES RECEIVED AND THE DURATION OF PROGRAM PARTICIPATION

Type of Service[a]	Percent of Participants Receiving	Average Weeks Enrolled in the Program
All Services	100	38.7
Job Search Services Only	43.4	33.1
High-technology Class-size programs[b]	5.9	54.5
Other class-size programs[c]	12.4	45.8
Existing programs offered through local educational institutions[d]	28.6	40.5
On-the-job training	9.7	40.0

SOURCE: Adapted from Kulik, Smith, and Stromsdorfer (1984)

NOTE: The sample is restricted to program participants; N=185.

[a]As recorded in the program management information system.

[b]Includes electronics technician and numerical control operator courses developed specifically for program participants.

[c]Includes pipe welder, machine operator, energy auditor, heating and cooling operator, and screw machine operator courses developed specifically for program participants.

[d]Existing programs that were not designed specifically for program participants, but that were attended by participants and paid for by Downriver ERA program funds.

high-technology training program, such as electronics technician and numerical control operator courses, specially designed for this group of participants. It also shows the average time spent in the program by participants selected into different program options.

Table 6 reveals the expected pattern, namely that those enrolled in lengthier programs will not be available for job search as early as those in less time-intensive programs. Table 7, from the Downriver evaluation, shows that although some training did have a positive impact upon reemployment, the specially designed "high-technology" programs actually had a negative effect upon reemployment.

The general conclusion reached by the evaluation of the Downriver program was that programs could make a positive difference, but that it appeared that job search programs were both effective and cost-effective. Whereas skills training in the Downriver program had cost $1,700 per participant, job search training had cost $628 per participant.

As the first phase of the Downriver program was being evaluated, another set of demonstration projects, designed this time to ascertain whether a successful program model could be replicated, was designed and implemented. In table 8, program outcomes from the six demonstration sites are shown. The program outcomes varied widely, with placement ranging from 9-81 percent. Emphasis was placed upon the difference between job search costs, ranging from $400-1,000 per participant, compared with the $800-3,500 per participant cost of skills training. This evaluation was begun in 1982.

Program Outcomes

A large-scale review of JTPA Title III programs for dislocated workers was performed by the U.S. General Accounting Office (GAO) in late 1986 (GAO 1987). Table 9, taken from that report, shows the demographic characteristics of all displaced workers as revealed by the Current Population Survey study of January 1984, compared with the characteristics of those participating in the responding 600+ JTPA programs in operation between July 1984 and June 1986. This table reveals what anyone would expect: that those participating in programs are white, male, of pre-working age, and of higher educational attainment than those not participating. Although concerns might be expressed about the ultimate outcome for those with even greater disadvantages in terms of lower educational attainment, it is clear that those participating should, on average, be better candidates for retraining than those not participating.

However, as table 10, taken from the same GAO report, shows, although retraining was offered in basic skills, new job skills, and on-the-job training, a minority of participants either selected or were selected for this training. Moreover, this training tended to be of limited duration. In table 5, Downriver participants in new job skills training spend between 28 and 47 weeks in training; the larger group of Title III participants spent on average only 9 weeks. On-the-job training was also more time-intensive for the demonstration project participants, over 36 weeks compared with 15 weeks.

It is also instructive to review what kinds of job training were made available to participants in those 600 responding programs. Examples of vocational training offered in the programs are shown in exhibit 1. Unfortunately, data are not available to show which of these vocational programs showed the best outcomes in terms of rapid reemployment and post-program wage rates.

TABLE 6

REEMPLOYMENT RATES BY MONTHS FROM PROGRAM ENROLLMENT

Months from Program Enrollment	Participants Enrolled in Classroom Training	Participants Enrolled in Job Search Only	Difference in Reemployment Rates
1	4.5 (2.5)[a]	6.1 (2.9)	-1.6
2	7.5 (3.2)	12.1 (3.9)	-4.6
3	13.4 (4.0)	19.7 (4.7)	-6.3
4	20.9 (4.7)	24.2 (5.1)	-3.3
5	31.3 (5.3)	28.8 (5.4)	2.5
6	32.8 (5.7)	33.3 (5.6)	-0.5

SOURCE: Adapted from Kulik, Smith, and Stromsdorfer (1984)

NOTE: The sample includes program participants, enrolled in job search only or classroom training, who were not reemployed before program enrollment. There are 66 job search and 67 classroom training observations. To adjust for the censoring of the observation period, these reemployment rates are estimated from the period-by-period conditional probabilities of reemployment in a life table framework.

[a]Standard errors of the reemployment rate are in parentheses.

TABLE 7

REEMPLOYMENT RATES OF PARTICIPANTS BY TYPE OF PROGRAM SERVICE

Program Service	Actual Reemployment Rate	Marginal Effect of Training on Reemployment Rates: Adjusted[a]
Job Search and Placement Assistance Only	67.1	–
Any Training Program	73.9	4.3
High-technology class-size programs	50.0	-18.9
Other class-size programs	80.0	11.0
Existing programs offered through local educational institutions	73.9	7.2
On-the-job training[b]	81.3	1.9

SOURCE: Adapted from Kulik, Smith, and Stromsdorfer (1984)

[a]A probit model of reemployment with variables indicating the type of service received was estimated for participants only. Reemployment rates by service were predicted, using the average characteristics of participants.

[b]On-the-job training recipients are reemployed if they held a job after exit from the program.

TABLE 8

PROGRAM OUTCOMES

Outcomes	Alameda	Buffalo	Lehigh Valley	Milwaukee	Mid-Willamette Valley	Yakima	Total**
1. Participants	3,231	798	1,028	2,713	305	243	8,318
2. Placements	569	523	412	151	185	195	2,035
3. Recalls	620	27	26	00	0	0	673
4. Other Terminations	2,042	248	590	2,562	120	48	5,610
5. Transferred to other programs after Sept. 30	1,684	0	200	0	3	8	1,895
Employed Enrollees							
6. Average wage upon entering employment	$ 7.19	$ 6.87	$6.83	$ 6.59	$ 7.32	$ 8.11	$ 7.15*
7. Average wage at layoff	$11.50	$10.80	$ 9.49	$ 8.80	$10.38	$ 9.98	$10.16*
8. Average wage	37.5%	36.4%	28.0%	25.1%	29.5%	18.7%	29.2%*
9. Mean weeks from layoff to employment	74.5	67.4	52.1	Not calculable	50.1	Not calculable	
Percent entering employment of those receiving:							
10. Job search only	36.3%*	63.2%	40.6%	4.2%	69.5%	87.8%	50.3%
11. Classroom Training	42.0%*	60.7%	43.6%	–	43.8%	40.0%	46.0%
12. On-the-job training	Not available	83.8%	50.0%	Not available	–	90.0%	74.6%

SOURCE: Adapted from Jarrett, Kulik and Smith (1983)

* Figures are not available to support a full breakdown of participants in job search only, classroom training, and on-the-job training in Alameda County. The figures shown here are for participants in ACTEB-funded training and for all other participants.

** "Total" rates shown here are simple averages of project rates, not distinguishing the different sizes of projects.

TABLE 9

COMPARISON OF DISLOCATED WORKER CHARACTERISTICS

(Figures in percents)

	Title III participants	Unemployed dislocated workers as of January 1984[a]
Age		
Under age 55	92	80
Age 55 and over	8	20
Education		
Less than high school	22	32
High school graduate or more	78	68
Gender		
Males	60	69
Females	40	31
Race[b]		
White	69	79
Minorities	31	21

SOURCE: General Accounting Office (1987)

[a]From the supplement to the January 1984 CPS.

[b]Hispanics are included as minorities in Title III statistics, but in the Current Population Survey data, they may be included in the totals for either race.

TABLE 10

TITLE III ACTIVITIES

Activity	Description	Median length	Percent of projects offering	Percent of participants receiving
Training	Basic skills training	2 weeks	30	6
Remedial	New job skills	9 weeks	77	26
Classroom	New job skills in work environment	15 weeks	69	16
On-the-job				
Placement assistance Job counseling	Orientation, assessment, and identification of employment options.	Ongoing	84	84
Job search	Enhance job search skills or job referral	No fixed time frame--44%; 2 weeks or more--35%; less than 2 weeks--21%	84	66
Support services	Assist participants while enrolled in Title III		67	23

SOURCE: General Accounting Office (1987)

EXHIBIT 1

EXAMPLES OF CLASSROOM TRAINING OFFERED IN TITLE III PROJECTS

Aircraft mechanical operations	Health and medicine
Airline attendant	Heavy equipment operator
Air conditioning and heating mechanic	Hotel-motel manager
Asbestos handler	Industrial maintenance
Auto mechanic	Industrial sewing
Bank teller	Institutional attendant
Boat building	Iron pourer
Bookkeeper	Lab technician
Cabinet maker	Landscaping
Cable splicing	Machine tool and die
Carpentry	Machinist
Casino worker	Mechanical, electrical engineer
Chemical operator	Office machine service
Clerical and office work	Printing and publishing
Computer repair, maintenance	Real estate
Construction	Retail trade
Culinary arts	Security guard
Data processor	Statistical process control
Day-care worker	Telephone technician
Drafting	Truck driving
Diesel mechanic	Tourism occupations
Electronics	Upholsterer
Energy conservation work	Welding
Fisherman	Xerox technician
Golf course mechanic	

However, some outcome data are available from the large number of programs assessed by the GAO and detailed in the report. Shown in table 11 are outcomes in terms of reemployment and hourly wage rates broken out by various categories, including sponsoring group, specificity to an event or a group, and the presence of classroom training or on-the-job training. The GAO report also shows that, at most, 6-7 percent of those eligible for JTPA Title III participated in any one program year.

In the preceding chapter, it was noted that data from the Current Population Survey in January 1984 showed that 60.9 percent of those experiencing permanent job loss had become reemployed. Although JTPA Title III reemployment rates may not be very impressive, perhaps post-program wage rates and the quality of the new jobs surpass what could have been obtained without program intervention.

In table 12, findings from a group commissioned by the U.S. Department of Labor to select and describe "exemplary" dislocated worker programs are shown. It is interesting to note the emphasis placed upon the psychological benefits associated with entry into school and careful development of working relationships among provider institutions. Job search assistance is clearly identified as a central element of the successful dislocated worker program.

The lesson learned from the demonstration projects is generally that, although skills training may be effective, the probability of both the effectiveness and cost-effectiveness of job-search skills training is much higher. Review of many JTPA Title III programs reveals that all types of training form a quite small fraction of the services provided, whereas 84 percent of Title III participants engage in job search training.

Some points emerge quite clearly. Skills training must often, for the dislocated worker, occur after a basic or remedial program designed to provide new basic skills or to brush up rusty, seldom-used skills. All of this requires planning, funding, good future labor market information, and perhaps most important, time from the dislocated worker to be invested in his or her future. That time is often not available for what may be a protracted re-education effort. To accomplish a lengthy retraining program is, for participants and program operators alike, an extremely difficult task under any circumstances. It is even more difficult when it must be done reactively and in haste. If remediation and prevention of skills obsolescence among American workers are the sole objectives of JTPA Title III, those objectives are not being met. However, if rapid reemployment of those seeking program assistance is the objective, clearly the program has offered a great deal in many settings.

TABLE 11

JOB PLACEMENT RATES AND WAGE LEVELS BY PROJECT CHARACTERISTIC

	Average placement rate	Average wage level
All projects	69%	$6.61
Project operator		
Employer/union	71%	7.62
Public	69%	5.93
SDA-PIC	66%	6.70
Educational institution	70%	5.88
Focused on specific population or event		
Yes	65%	7.03
No	69%	5.91
Job linkage		
Yes	78%	5.44
No	68%	6.24
Classroom training		
High emphasis	66%	6.66
Medium emphasis	70%	6.02
Low emphasis	71%	6.17
On-the-job training		
High emphasis	78%	5.69
Medium emphasis	74%	5.80
Low emphasis	66%	6.52

SOURCE: General Accounting Office (1987)

TABLE 12

OUTCOMES OF UNEMPLOYMENT AND ADJUSTMENT PROGRAMS

Sample	Factors	Components	Conclusions
Beaumont, TX. Golden Triangle WorkerAssistance Program	High unemployment (12-13%) and $492,364 government (federal and state) funds	Outreach; Intake and Assessment; Job Search Workshop and Job Club; and Referral Activities.	The Worker Assistance Program has been successful in placing dislocated workers in jobs that pay well. Most singular factor affecting program activities is the cooperative relationship between HRDI and TEC. Other factors that have assisted include the program's outreach activities and the screening of applicants prior to enrollment. Employment rate 76%.
Alabama Skills Training and Education Program	High unemployment (13.7%) and $2,861,116 (nominal cost)	Recruitment; Certification; General Orientation and Assessment; Job Development; Classroom Training; On-the-Job Training; Supportive Services; and Relocation.	1. Attention to participant assessment results in participants who are well matched to existing training and employment opportunities before they are enrolled. 2. All classroom training courses use a competency-based instructional program. 3. Motivation technique for setting job placement quotas. 4. Practice of extending enrollment periods to provide more job search time may mean that entered employment rates are increased merely as a function of time. COMMENTS: Control to the operation of STEP is the unusual tri-level management arrangement in which management responsibilities are shared among three entities--the skill center directors, the STEP coordinator and program development unit, and OET. Management hierarchies are a matter of influence, not authority; 84% employment rate.
Western Maryland Consortium Dislocated Worker Program	High unemployment (7.9%) and $131,178 cost	Eligibility Certification and Intake; Retraining; Job Search and Job Club; Supportive Services.	1. A key factor was the location and the atmosphere of the Dislocated Worker Center for maintaining worker morale. 2. Screening of applicants. 3. Low cost demonstrates the value of working with other groups, particularly employers and unions. 4. Opportunity to enter college provided an important morale boost for dislocated workers.

SOURCE: CSR Associates (1986)

TABLE 12–continued

Sample	Factors	Components	Conclusions
Lane College Dislocated Worker Program Eugene, Oregon	High unemployment (11.9%); predominantly white; and $265,000 cost	Recruitment and Eligibility Certification; Orientation; Assessment; Vocational Counseling; Job Search; Resource Center; Classroom Training; Entrepreneurial Training; On-the-Job Training; Support Services; Placement.	1. Project operated by a postsecondary educational institution via a performance-based contract. 2. The emphasis in Job Search Training is on life and career planning, not just job search mechanics. Also, work on self-image, etc.; and philosophy of 100% placement. 3. The project's convenient location has a big effect on participation.
Project Refocus Kansas City, MO	Low unemployment (5.7%) and $211,232 cost	Outreach and Recruitment; Orientation Assessment; Job Skills Assessment Workshop; Job Club; Job Development; On-the-Job Training.	**Intake and Assessment Process** 1. Recruitment and orientation were able to maintain optimal enrollment levels. 2. Able to match participants to an appropriate mix of services with a minimal outlay of project resources. 3. Participants who need training are well matched to job training that they will complete successfully. **Classroom Training** 1. Graduates 85.7% probability of employment. 2. Occupations selected that fit the demands of the labor market with emphasis on higher wage jobs. 3. Training curricula contain information directly related to the skills and knowledge needed on the job (i.e., reduces training length). 4. Individualized instruction. 5. Monitoring system.
Whirlpool Dislocated Worker Program St. Paul, MN	Low unemployment and sufficient funding	Outreach; Orientation; Counseling; Job Search Assistance; Training; On-the-Job Training; Supportive Services; and Placement.	1. Strong positive impact that early notice at the closing can have on retention, outcomes, and project success was emphasized by staff. 2. The case management system is hailed by staff to ensure absolute accountability of participants and cohesiveness of service delivery. 3. Efforts by the city to link the Title III System with economic development activities have increased placements. 4. No denial of enrollment to any applicant. All are served and nearly all are reemployed at good wages.

TABLE 12–continued

Sample	Factors	Components	Conclusions
Los Angeles Harbor Area/ Long Beach, Calif. Dislocated Worker Project	Low unemployment, racially mixed, and cost of 1.9 million	Intake and Eligibility Determination; Orientation; Vocational and Stress Counseling; Classroom Training; On-the-Job Training; Job Search; Job Development and Placement.	1. Degree of cooperation and coordination among different employment and training organizations is significant. 2. Degree of communication among the staff members of the participating organizations creates an atmosphere of mutual support and cooperation. 3. Project has adapted well to the needs of a special disadvantaged participant population. 4. The prelayoff orientation served as a crucial first step to an early response to the groups of dislocated workers. 5. Provision for professional stress counseling for staff and participants. 6. Use of private training vendors.
Farmall Outplacement Center Rock Island, IL	Above average unemployment rate (8-10%) and $454,000 cost (financed by International Harvester)	Outreach/Recruitment; Job Search; Job Search Workshop Resume Development; Placement; Relocation (optional).	1. Involvement of the former employer and union of the laid-off workers is exemplary. 2. Location and design of the physical facility influenced the effectiveness of intervention. 3. Utilized SDA and community college resources.
Aroostook County Action Program Aroostook County, Maine	Above average unemployment (8-10%); budget $211,232; rural based with a lot of women.	Recruitment; Intake/ Orientation; Employment Transition Workshop; Job Search; On-the-Job Training; Classroom Training; Counseling and Supportive Services.	1. Gap between grant application and contract execution tended to reduce the potential of the project. 2. Job training programs must incorporate participation motivation elements. 3. 13 years operation without forming an institutionalized bureaucratic approach. 4. Participation in the ACAP Title III program contributed significantly to participants' chances of being hired. 5. The plant reopened and employed a significant number of participants.

PREVENTING OBSOLESCENCE AMONG THE CURRENTLY EMPLOYED

In this chapter, some possible sources of obsolescence are discussed. Evidence about skill deficits is presented from several sources, including employer interviews. The potential of technological change for requiring both communication skills and technical skills is discussed both in technical and organizational terms.

Problems among New Hires: An Accidental Case Study

In 1983, a research group at the University of Michigan developed a survey of employers in a relatively depressed area in Michigan outside the Detroit metropolitan area (Gordus et al. 1984). The goals of the survey were to ascertain in which sectors and occupations job openings from both employment growth and anticipated turnover would occur, what training such jobs require, and where employers would turn for potential employees. A portion of the survey was dedicated to investigating employers' needs. Almost casually, the survey team added questions about what problems employers had encountered, if any, with their most recent hires. That question produced information confirming anecdotal evidence the research team had acquired before.

Employers who had chosen carefully from a surplus of applicants had numerous concerns about the skill levels of their new hires and of their longer-term employees. Almost no concern was voiced about technical skills. Employers said: "We can train them or we can have them trained. But what we need is people who have mastered skills such as adequate communication skills, adequate computational skills, the ability to follow directions but also the ability to confront a situation, analyze it, and choose among the relatively common options available for resolving problems." Willingness to work was generally not identified as a problem, but the capacity to work, to apply some fundamental skills normally associated with secondary school completion, and to learn on the job was consistently found to be absent among employees.

A startling aspect of the results of this survey was the identification by respondents of deficits in basic skills in carefully selected employees. Among the several hundred respondents to this survey, only two or three employer respondents--at most--could be considered to be associated with any new technology.

Basic Skills Deficiencies

These findings are far from unusual. The Office of Technology Assessment (1986) estimated that roughly 20 percent of those dislocated from employment from 1979-1984--over 5 million individuals who had had long-term attachments to their employers--could be characterized as deficient in basic communication and computational skills. This estimate is discouraging; its implications are even more discouraging. Generally, it is true that older age is associated with lower educational attainment; thus it has been in the American work force since such statistics have been

kept. By and large, the casualties of the recessions of 1979-1983 were younger, more highly educated workers, suggesting that those remaining in many American establishments have a higher probability than 20 percent of some educational deficiency that would negatively affect work performance and productivity (Blair 1984).

Clearly then, obsolescence--if it is defined as a task-associated deficiency in the job that currently exists--is a serious problem for employers in many areas as they attempt to fill entry-level positions even when there is a surplus of applicants for these positions. The Michigan survey addressed entry-level positions and made inquiry about recent hires, generally younger workers. However, obsolescence is more often associated with establishments in the process of change and with older employees, presumed to have had adequate skills at one time, but now exposed to challenges that their technical preparation did not encompass. This process raises the question of technological change and its impact upon the education and training requirements for smooth implementation of technology.

The Challenge of Technological Change

First, it is important to emphasize that much of the literature on technological change conveys the impression that job change and job shifts occur rapidly and that the usual outcome of the implementation of technological change is negative for employees. Further, there is often a strong suggestion that technology somehow has a life of its own. To date, the historiography of responses to anticipated technological change in the United States in the 20th century alternates between fear of its employment impact and assurances that all can benefit. Generally, concerns about the impact of new technology tend to be coincident with periods of high unemployment that was not associated primarily with the implementation of new technology. As the business cycle nears the bottom of a trough, layoffs occur in durable goods manufacturing. If future prospects appear favorable, the downsizing or elimination of a department or a shift may provide the opportunity for the installation of new technology provided the capital is available. The layoff period could also be a convenient time for retraining employees expected to return to an altered workplace. Unfortunately, this orderly pattern of training, retraining, and implementation appears to take place seldom, raising still more concern about what impact the technological change will have upon employment levels and conditions.

Choices of both technologies and methods of implementation are difficult for management. The recent proliferation of independent and university-based technology transfer and implementation centers indicates that assistance is often required in this complex process and that willing partners are available. Moreover, that assistance is required by both large corporations and smaller enterprises as well. New technology requires a significant investment and implies organizational change. Further, a routinely identified major barrier to implementation of new technology, particularly for smaller firms (Jacobs 1987), is the "lack of trained personnel to choose, implement, operate and maintain equipment."

Although sensational predictions (Ayres and Miller 1982) arouse public interest and concerns, more careful analyses indicating the relatively slow growth of the robotics industry and the rather stately pace at which implementation must take place (Hunt and Hunt 1983) tend to draw less attention. The robotics industry and the utilization of this type of automation are among the most advanced, compared, for example, with computer-aided design (CAD), computer-aided manufacturing (CAM), and computer-integrated manufacturing (CIM). Some formats of interlocking production modalities such as flexible manufacturing systems (FMS) are still under development.

However, if the choice is between providing support for the introduction of automation and ultimately relinquishing to overseas firms large numbers of jobs, some of which could be retained within the United States by introduction of automation, many companies and public entities have already made the choice for technological change. (This section and those following rely on the work of Forester 1981, 1985, 1987.)

The aforementioned technological advances are considered "hard technology." The replacement of human welders and human painters in durable goods manufacturing is a rather simple substitution of human efforts with programmable machines, what might be called traditional technological change.

There is another type of technological change, the introduction of "soft technologies" where few if any alterations are made in the repertoire of machines available to complete work. However, changes in the process of work are encouraged in order to increase productivity through reduction of flaws in products and services, downtime for many reasons, and use of information either available to or already possessed by those closest to the operation. Major advances in productivity can take place through what seem to be simple, sometimes almost simplistic, ideas.

A major "soft technology" is most often called by the name assigned it during its first phase at the General Motors Corporation, quality of working life (QWL). More properly, this general kind of worker participation is directed toward workplace problem areas. Experienced QWL consultants and trainers are aware that the early phase of implementation often centers upon issues with a dazzling lack of relevance to productivity, decisions about company events, or community participation, items that are selected because they are expected to arouse little complaint.

Often, early implementation ceases when such groups or circles become entangled in issues not readily handled at that level. In full implementation, a QWL process with small groups often is a problem-solving session of the simplest sort. People identify troublesome snags in the work process, brainstorm ideas that could help solve the problem, prioritize the ideas remaining after a selection and discussion process, agree upon a choice of actions to be taken, and decide to try the solution commonly selected as the best available at the time. This process requires people, chairs, an easel, a flipchart of newsprint, and some magic markers, the only source of magic in any technology. The implementation of technology in this case may appear to be ludicrously simple. However, in many establishments, particularly in manufacturing, a verbal process requires public speaking, a major source of fear for most adult Americans and a great threat to people whose work has not required speaking. In addition, when literacy skills are either lacking or very rusty, the challenge of speaking in public, writing ideas on newsprint, or reading from the list developed is frightening. Often, what has been perceived as ideologically based worker resistance is often fear of a verbal process that, to the uninitiated, looks both too simple to work and too frighten-ing to try.

Other "soft technologies" are also normally assigned acronyms. Just-in-time inventory (JIT), called kan-ban in Japan where it was broadly adopted, was first seen in its fully articulated form in the Ford Motor Company River Rouge complex. JIT means that factories or, for that matter, almost any workplace, keep on hand only what is required in the near future rather than stockpiling supplies. This system has the benefit (though it may not be perceived in that way at the outset of implementation) of requiring a very low level of flaws in supplies. It also has the obvious advantage to the end-user of transferring storage as well as financing changes to a supplier. Should faults be uncovered when there is a small supply of parts, work often must cease until additional supplies are secured.

The technology involved in immediate implementation of JIT is most often a computerized inventory system that requires that workers be able to develop, maintain, and utilize computer-aided management information systems to control supplies. However, as implementation proceeds, suppliers, often in concert with users, must often improve quality of supplies.

A common method used for this improvement of quality, again developed in the United States but most broadly adopted in Japan, is statistical process control (SPC). In principle a relatively simple quality control measure, the technological change requires that workers understand relatively basic computational and statistical concepts and operations.

The Need to Integrate Technologies

Increasingly, technological change, even a relatively minor and not particularly complicated technical change, has impacts beyond the office, business, or factory making the change.

Both the content and process of implementing statistical process control, just-in-time, and worker participation would enable the firms in question to achieve useful flexibility by developing in their workers basic and critical thinking skills. Although many productivity difficulties are resolved by the relatively inexpensive implementation of such obvious changes, providing the relevant training is part of a complex process.

To be most effective in smoothing implementation of new technology, such training should be based firmly upon a verifiable foundation of basic communication and computational skills, enhanced next by computer utilization, calculator utilization, basic statistics, and group problem-solving skills. Work-ers possessing a repertoire of these skills, supplemented no doubt by machine-and equipment-specific skills learned on the job earlier and upgraded with both generalized and highly specific machine and equipment training, are valuable assets indeed.

Current American workers can join and have joined the ranks of these technologically literate and participative employees. One example is the NUMMI facility in California, where a reputedly difficult group of former autoworkers from a facility closed by General Motors were rehired by a GM-Toyota joint venture. New management, group process utilization, and some skills training have all served to transform this old unproductive facility into one of the most productive manufacturing complexes in the country.

Missing the Target in Training for Technology

Educational institutions are relatively rigid in personnel practice since tenure or some variation of it is common. Moreover, funding is always a problem. Therefore, the institutions seeking to provide training are in many ways more limited than private companies. They must constantly renew and supplement their human resources and they must somehow accommodate the fact that customized training associated with new "hard technologies" requires investments in equipment that few single institutions could possibly afford.

Another targeting problem identified by Jacobs (1986) is also crucial. Robotics training and other highly specific training have been provided by institutions to younger students who are entry level or to displaced workers. Neither of these groups is very likely to become rapidly reemployed by firms implementing such technology since personnel practices and collective bargaining agreements call for the retraining of currently employed workers. Very often it is those same groups of older workers whose probability of having basic skills deficiencies are even higher (due

to their age) than their younger associates who, when unemployed, were likely to have a one in five chance of having serious basic skills problems.

Training, Implementation, and Integration

There are two inescapable challenges associated with retraining for those in the workplace, especially when new hard or soft technologies are involved, even those dealing with magic markers and newsprint. One is information. Traditional providers of learning and training are not on the cutting edge of technological development and consistently require information not only about technologies but about how they are to be implemented. The other is that a host of difficulties, including unacceptable levels of expense involved in using work time for provision of general training, the special qualifications of vendor firms for machine-specific training, and the need to integrate what is learned, even at a very basic level, with what is to be done, makes employers logical providers of much training and logical sponsors of a great deal of other training. The logical and perhaps only appropriate site for much continuing training and education is the workplace itself. This requires a new set of organizational arrangements among multiple institutions. Many of the institutions involved, such as large employers and major educational institutions, are themselves very rigid organizationally.

This brief overview of some demands placed upon the current work force by organizational and technical change indicates that possible obsolescence among the currently employed will require training both in technical and general skills as well as, in many cases, basic skills.

The next chapter explores a number of situations in which different sets of worker characteristics, employer needs, and available resources have been combined to meet the common interests of individual workers and the several cooperating organizations. Case studies of basic skills training will be emphasized, since it is the most serious need and much more widespread than previously supposed. Moreover, it is fundamental to the more technical training and advanced specific skill training that is probably much easier to implement in order to upgrade the work force than a basic skills program. Moreover, the lessons learned in this most difficult training implementation--the need for good information, integration with the activities at the workplace, and the need for changing institutional practices--are fundamental not only to specific training but also to implementation of all changes necessary to enhance productivity.

RETRAINING IN THE WORKPLACE: ISSUES OF CONTENT, COSTS, AND OWNERSHIP

Introduction

Since the overview of the needs in the workplace emphasized the need for basic and remedial training as a foundation for further technical and skills training, the major focus in this chapter is upon adult basic skills programs and associated technological-adaptation training such as statistical process control. These cases, as observed in this chapter, are not representative.

To provide some sort of background against which these cases may be placed, estimates taken from Conference Board data (recalling of course that this survey was conducted in the mid-1970s) could be helpful. In 1974-75, 4.4 million employees had participated in in-house training--70 percent of all employer-supported training. A more recent study (Carnevale and Goldstein 1984) expands upon the 1974-75 study. Its conclusions are that industry and government provided about 17.6 million courses to 11.1 million workers in 1981. About 12 million courses, or 68 percent of the total, were given in house and the balance in outside institutions. Significant differences of opinion exist about the precise costs per year of such training, ranging between $30 and 40 billion annually.

The authors of this study observe that no estimates in this area are definitive. There is a great need for "better basic data and careful analysis of the extent and character of employee training in the United States." The simple fact is that the amount of empirical data in this area is very scant and what is available is often suspect. These data are dated, biased, or incomplete since they were collected for other purposes.

Because there was no adequate set of employer-training databases or reports from which a sample of companies could be chosen for case studies, the cases presented here were suggested to us for study because they featured different types of employers, employees, approaches, and organizational arrangements. They also appear to be highly regarded programs. A smaller amount of detail is given about two unusual multifirm or multiorganizational arrangements since they were clearly designed to meet immediate technological change requirements.

Adult basic education offered in the workplace is an increasingly popular and viable option to meet the needs of adults with marginal proficiency in important skills, most often reading and basic mathematics. Because basic skills programs enhance employability, improve job performance, and support the introduction of new job skills and technologies, both the employer and the employee benefit from employee participation in basic skills programs. Examples of companies where such programs are or have been available include the Cummins Engine Company, Polaroid Corporation, Ford Motor Company, Onan Corporation, and Blue Cross/Blue Shield of Massachusetts. In this section, basic skills programs at these companies and a relatively new basic skills curriculum called the Comprehensive Competencies Program are reviewed. We attempt to show how the goals of the sponsor of the program can have an impact on the program, on the requirements the program

generates for equipment, instructors, and instructional methods, and ultimately on the education received by participants.

The ways in which education is provided to employees and the content of that education are strongly influenced by the objectives of the company or, in the case of the Academy in the Ford Ypsilanti Plant, Ford and the United Auto Workers Union (UAW). The company or union that provides funds and resources for the program is referred to here as the "funder," the entity that provides instruction as the "provider" of the education, and the employees who receive the education as the "participants."

There are four types of cost involved in education in the workplace: the cost of the instructors' time, the cost of any equipment and books that must be available at the workplace for the educational program, the cost of preparing space (the learning center) for the educational program at the workplace, and the cost of employees' time in the program. In some cases, the funder ultimately pays three costs: the costs of instructors' time, equipment and materials, and space availability. Employees attend classes on their own time and thus bear the cost of foregone leisure time. In other cases the company also pays for the employees' time by allowing them to take courses during working hours, which affects the incentives for employee participation.

The choice of the provider of the educational program is an important way the funder makes its influence felt. Whether the provider is itself part of the funder or an independent institution paid to provide educational services affects how well the provider meets the objectives of the funder. The funder has more opportunity to shape content when it assumes the cost of providing education directly, rather than paying an outside institution to provide the education. Funder involvement in the content can increase the incentive for employees to participate by making instruction relevant to work experiences. Making a connection between job skill needs and basic skill instruction can also benefit a sponsoring company.

The type of educational program offered and the type of learning center, in each case described here, are explained by the way funder goals determine the structure of the program and the division of duties and direct costs between the funder and the provider. The cases are presented in an order roughly determined by how intimately involved the funder is with the provision of education. These case studies are based on structured telephone interviews undertaken in April and May 1987 by two of the authors, Gohrband and Meiland.

Cummins Engine Co., Walesboro, Indiana

Recent company-sponsored education and training at the Cummins Engine Company has been left largely to plant management; there is technical training at most Cummins plants. There is no companywide effort in basic skills education; thus, this review of a single program is not a review of corporate policy on basic skills instruction. The integration of basic skills instruction with technical training in this case is so complete that it is not easy to compare this program to the others reviewed here. It cannot be judged as a basic skills program when basic skills instruction was not a major objective. This case mainly shows how company technical training differs from programs in basic skills at other companies.

The decentralization in training activities at Cummins has led to a variety of materials, techniques, and programs according to the needs perceived by the management. Three instructional strategies have been used: on-the-job training, classroom training, and self-paced, interactive instruction. Two unifying education and training policies at Cummins are that (1) every program

develops some skill that is useful to the company and (2) all training is done during the work day on company time, with hourly employees released to work at the training center.

The program was offered at the Walesboro plant, near Columbus, Indiana. At Walesboro, 150 hourly employees participated in a voluntary program to upgrade their technical and basic skills. Two modes of instruction were used: classroom instruction by teachers and computer-aided, self-paced instruction using PLATO instructional software and an eight-terminal computer lab. Subjects offered included blueprint reading, shop concepts (including shop math), and statistical process control (SPC). Consistent with company policy, employees were extensively tested to determine whether they achieved a satisfactory level of performance.

Despite the decentralized structure of training, Cummins as the funder is intimately involved in its educational programs, which are treated as another job responsibility. The only difference between other work and training at Cummins is that participation in training is optional. Once training is selected, it is part of the job. The incentive to participate, for those who feel they will succeed, must be strong. The integration of basic skills with technical training offers employees the opportunity to overcome barriers to promotion imposed by an inadequate background in math or reading. Basic skills instruction takes place in the same locations and as part of the same corporate strategy as technical training. Conspicuous by their absence are programs that are usually considered part of a basic skills program: basic reading, writing, and General Equivalency Diploma (GED) preparation courses. This may reflect a high proportion of high school graduates in the work force with more need for pretechnical training such as shop math than for broadly focused basic skills and high school diploma courses.

A high proportion of high school graduates in the work force may not be an adequate assessment of the skill level of the work force. Onan Corporation (discussed in detail later) found that a high proportion of high school graduates in the work force does not necessarily mean that the level of basic skills in the work force is satisfactory. In 1983, 90 percent of its 615 hourly employees had high school diplomas, yet an assessment revealed that 60 percent needed help in reading blueprints and specifications. Onan now has a program that teaches basic reading and writing as well as blueprint reading. A program that treats training as part of the job may also overlook the needs of those less confident of their academic ability. They may avoid such a program because of a fear that any failure would reflect badly on them in the eyes of management.

Polaroid Corporation, Cambridge, Massachusetts

From the time Polaroid established its first manufacturing facility, it has made a considerable investment in the development of high quality training and education programs for all levels of employees. In the beginning, the program focused primarily on high school math and chemistry. In the late 1960s, GED, Adult Basic Education (ABE), and English as a Second Language (ESL) programs were added and a full set of diagnostic and assessment instruments was developed. This set of offerings was the beginning of the Fundamental Skills Program offered by Polaroid's Corporate Human Resources Development Group.

The Fundamental Skills Program was originally designed to provide training in basic literacy and arithmetic, but has expanded to include a technology readiness curriculum. This program includes more advanced mathematics and science, computers and instrumentation, and skills for "sustained learning." This part of the curriculum takes in problem solving, study skills, speaking and listening skills, human relations training, and career management.

The program has grown to become an integral part of Polaroid's system of employee compensation and promotion because of its demonstrated ability to certify accurately the skills of the employees who pass through the training and assessment. Polaroid has established a system of skill criteria for jobs at all levels that are linked to courses available through the Human Resources Development Group. Polaroid's strong corporate commitment to continuing education and training for all employees is rooted in the benefits derived from having a system for matching employee skills with the jobs they do.

An organized program of referrals, consulting, and assessment is available through Polaroid's Human Resources Development Group. The focus of the Polaroid educational effort is on the skills people need to improve their job performance or to prepare for job growth. The skill needs of individuals are established by educational counselors working confidentially with individual employees. This element of confidentiality is extremely important to the employee. Confidential counseling is a way to fit an employee into a course in which the employee can have a reasonable expectation of success and to reduce the employee's fear of failure upon returning to an academic environment.

Taking assessment tests is also a way for employees to show their knowledge and establish credentials equivalent to those available by taking courses. An employee can then use the credentials established in the education and assessment program to prove that he or she is qualified for a more desirable job. The use of the credentials established by assessment and classes in the Fundamental Skills Program is under the employee's control.

Participation is voluntary, and courses are usually taken on a combination of company and employee time. The entire Fundamental Skills Program is designed to help the company and the employee by improving employee skills, which enables the employee to move up in the company. Acquisition of skills by the employee, which also helps the company as established by the skill criteria for jobs, is recognized as an important activity, and employees learn such skills on company time. The job criteria determine the division between the learning done on company time and the learning done on employee time.

The method of instruction throughout the Fundamental Skills Program relies on part-time professional educators who teach employees basic skills during regular work hours. Polaroid's instruction does not emphasize computer-assisted instruction because these methods have less flexibility than traditional stand-up teaching. The advantage of teachers over computers is that teachers have the flexibility to work with a wide variety of people with different abilities and deliver a consistently good educational product. The ability of a teacher to receive and act on the reactions of participants is an important quality computers lack. Working with a computer may appeal to some and not to others.

One-third of Polaroid's hourly work force of 5,000 are involved in the Fundamental Skills Program, either at the basic level or in the academic courses. The size and quality of the Polaroid Fundamental Skills Program is in part due to the concentration of Polaroid employees in the Boston area. It allows a centralized program that reaches over 90 percent of the employees, permits larger classes, and reduces the number of staff required. The compactness of the Polaroid operation permits the skill criteria for jobs to be companywide and gives the whole structure of skill criteria and course offerings credibility because course offerings are standardized and their connection with job skills can be understood throughout the company.

Beginning with the conviction that educational development for the work force would benefit the company, Polaroid, has, through long experience, achieved an impressive blending of funder, provider, and participant interest and competence.

UAW/Ford, Ypsilanti, Michigan

A basic skills program called the Academy has been offered to the employees of the Ford Motor Company's Ypsilanti plant for almost 3 years, but it has its origins in a program that was founded by Eastern Michigan University to serve its own employees and residents of the Ypsilanti area with marginal literacy skills. In its origins, therefore, the Academy is somewhat unique. It was not created by a company or a union to meet a goal, but was created by educators as a literacy program. Control over the content and instructional style of the Academy resides with its director, who is an educator by profession and has been with the program from its beginning.

The Academy has an instructional staff of 11, called facilitators. There are two math facilitators, five reading facilitators, three computer-awareness facilitators, and the director, all of them Eastern Michigan University employees. The Academy offers Reading/Writing/Speaking from developmental to postsecondary level, Basic Math to SPC Math, Computer Awareness and Advanced Computers, GED, Creative Writing, and Study Skills.

In September 1986, the Academy had an 800-square-foot facility in the neighboring union hall and 357 square feet in the plant. A new learning center in the plant will have four rooms with about the same total area. Two hundred and fifty hourly workers participated on their own time, in classes that met twice a week for 1 1/2 hours.

Staff-participant discussion is stressed as an instructional strategy throughout the Academy curriculum to bring out issues relevant to the participants and their jobs. Computer-based drill and other forms of automated instruction are not used in the Academy curriculum. The program uses home-grown rather than commercially available materials, and small classes are the norm, an average of 8-9 students per class. The Academy has at least one IBM-compatible computer, a VCR and monitor, slide projector, report-writing PC software, and an overhead projector. The computer is used in a course that teaches writing on the computer. Short videotapes are used to focus discussion.

Unlike the needs assessment policy at Polaroid or the policy of testing for knowledge gained from courses at Cummins, there is very little testing done at the Academy. Needs assessment takes place only for GED preparation classes, to ensure that those taking the test have a solid grounding in basic skills and will not pass with weak skills combined with a strong test-taking ability. Employee fear of failure is cited as the reason for the general absence of testing. Because the program is both voluntary and entirely on the employee's own time, it is necessary to accommodate these fears, otherwise the employees would simply be unwilling to participate and the educational product would not reach many who need it.

The Academy curriculum is designed to compensate for this lack of testing. Classes accommodate several different levels of ability. Small class sizes are required by this design to enable facilitators to give each individual adequate attention in the course of instruction. Participants are also held to rigorous attendance and task accomplishment standards, as conditions for finishing the courses, instead of tests of knowledge.

The director of the Academy program believes learning centers should incorporate the following features:

- o A supportive staff, who emphasize the positive qualities employees bring to their learning
- o A highly educated staff

- Comfortable, orderly surroundings
- An atmosphere of mutual trust and respect, which enables small group interactions like discussion and problem solving to take place freely
- Management assistance in promoting the program, including recognition by management of the achievements of participants

The Academy is highly regarded as a model adult education program. Its program and participants have been the subject of several feature articles in the local press, and its contribution to the individual growth of employees and to the location as a whole is widely recognized.

The organization of this learning center represents a departure from the in-house learning centers at Cummins and Polaroid, because the staff of the learning center is not employed by UAW/Ford. (UAW/Ford contracts with Eastern Michigan for the services of the Academy staff.) This is also the only program with a unionized work force. The relationship is not exactly "arm's length," however, as are the contract relationships in the next two cases discussed. Because of the Academy's commitment to Ypsilanti employees as individuals, which includes learning about their jobs and framing classroom work and discussion within that context, it is more responsive to the needs of the employees and the company than an education contractor with other clients and a separate institutional identity.

An example of this commitment is the development of the math curriculum at the Academy. According to the Academy's director, the introduction of statistical process control (SPC) into the Ypsilanti plant came to her attention through employee feedback. It is the policy of the staff to get to know employees and visit them on their jobs, both to promote participation in the Academy and to gather information useful for class discussion. Employees expressed a fear of SPC, because they felt that if they did not adequately understand this new aspect of their jobs, they would not perform well and could face sanctions from the company. Meetings with company managers were initiated to discuss how workers could be prepared for the introduction of SPC to various plant operations; together with knowledgeable plant personnel, Academy staff put together a math curriculum targeted on the needs of employees to understand SPC. The current SPC course is unique among the training offered at Ypsilanti because it is the only course taught on company time in which Academy staff take part in teaching.

Onan Corporation, Fridley, Minnesota

Onan Corporation, in Fridley, Minnesota, implemented a basic skills instructional program in 1983 to lay the groundwork for introducing new technology into its plant. An educational needs assessment by specialists at the University of Minnesota had shown that a significant portion of the hourly work force needed preparation in reading, writing, and mathematics before training in new technology could begin. The assessment team had an integral role in the identification of areas in which Onan employees needed additional education and the development of a curriculum to meet those needs.

The curriculum is called the Manufacturing Education Program (MEP), and it includes two major divisions, General Skills and Technical Skills. The General Skills division includes reading and writing, mathematics through trigonometry and shop math, and instruction in computers. The Technical Skills Division includes electrical, mechanical, and quality assurance training.

The curriculum is organized and taught by an outside vendor, the Metro-North Adult Basic and Continuing Education Program, in cooperation with company representatives. Onan works with the provider and the instructors to develop instructional materials and presentations using vocabulary, examples, and problems from the work setting. This strategy of making instruction relevant to job-related issues has been mentioned in connection with Polaroid and the Academy. To achieve this objective, with an outside arm's-length contractor as the provider, would require a lengthy relationship and relatively low instructor turnover rates. This provider was apparently involved with MEP from the beginning and had the insights gained from the initial assessment to work with.

Further information gathered from Onan on instructional methods indicates that instruction takes place in weekly 2-hour classes; computer-aided, self-paced instruction is not used; individual needs assessment is not done; and employees are not tested for knowledge.

As in the case of the Academy, MEP is a voluntary program available to employees on their own time, and it has also evolved without testing in order to encourage participation. Instructors compensate for the lack of individual needs assessment by doing an informal assessment of the class during the first stage of instruction. The instructor then delivers the material at a level of difficulty that seems comfortable for the participants as a group. This is a slightly different strategy for facilitating academic success, analogous to the commitment to individuals implicit in the individual counseling at Polaroid and the policy of staff interaction with individuals at the Academy. It is impossible to quantify the relative merits of these approaches with the data now available. All three of these programs have, however, fostered a belief among many hourly workers and management that education is important for personal development, which leads to improved job performance, according to the education program management.

The progress of participants in their learning is not monitored by testing. The conditions constituting completion of courses are under review at Onan with the intention of ensuring that employees do a minimum of work in order to earn their certificates of course completion.

There is no dedicated learning center; instruction takes place in space that was borrowed from two lunch rooms used by hourly employees. The instructional space is equipped with blackboards, tables, chairs, and storage space for class materials. A VCR; TV monitor; audiocassette recorder; film, slide, and overhead projectors; and duplication service are available. There is no charge to participants for instruction or books, but participation is on the employee's personal time.

The MEP at Onan was initiated by management to support the introduction of new technology; according to the Employee Training and Development Department at Onan, the program has been satisfactory for this purpose. The program seems to provide a full range of basic skills instruction without requiring elaborate equipment. By relying on an outside vendor as the provider and carefully scheduling existing space and equipment, Onan minimized the time and cost of starting the program. This promoted a relatively rapid increase in the educational level of its work force relative to the program cost.

MEP continues as a voluntary preparatory course of study for the long term, to support technical training that is done primarily on the job. Apparently, the initial needs study, the outlook for technological change in their industry, and their experience with MEP have convinced Onan management that a continuing educational effort in basic skills is a useful long-term policy to augment their manufacturing competitiveness, as opposed to a one-time training effort to support the introduction of a specific technology.

It should be emphasized that MEP is not merely a basic skills program. The General Skills division is linked to the Technical Skills division, which prepares employees for skilled jobs at Onan. MEP is more like an in-house vocational school than an in-house high school. It is hard to differentiate technical training from basic skills training in the Technical Skills division, which offers numerical control as a step between basic math skills and on-the-job training in setting up jobs.

From the employees' point of view, MEP is probably a means of overcoming barriers to promotion imposed by an inadequate background in math or reading. Because of the breadth of the offerings there could be spillover effects for the personal development of the employees beyond the workplace. The voluntary participation of employees in the Technical Skills division on their own time indicates that value placed on the vocational education offered must be fairly high and the commitment to the company strong. At Polaroid the rewards are more direct for obtaining the same skills; in many union shops employees would demand that training of a technical nature be restricted to company time.

Blue Cross/Blue Shield of Massachusetts, Boston

Blue Cross/Blue Shield of Massachusetts has an adult high school diploma program that is made available by its training department. The program grants a high school diploma after completion of high school-level courses or through competency testing. The curriculum was developed and is taught by an outside vendor, the Continuing Education Institute of Medford, Massachusetts. Thirty-six employees have completed the program since it began in 1982. Current enrollment in the program is 15; enrollment has grown slowly but steadily.

The mode of instruction is very traditional. The training director evaluated computer-aided instruction programs before selecting the Continuing Education Institute's program, but judged them to be far more expensive and perhaps less effective than the traditional methods used in this program. Class size is very small.

One of the interesting features of this program is a collaboration with other employers in downtown Boston whose employees attend classes with Blue Cross/Blue Shield participants. On occasion, Blue Cross/Blue Shield employees attend classes at other workplaces in order to take a course in the program that is not available on-site. Collaboration with other employers makes the program available even for a comparatively small number of participants. This has alleviated a chronic problem in scheduling on-site classes, which is the need to enroll a minimum number of participants from within a particular work force.

Most of the participants are clerical staff, with a few maintenance personnel. Their average age is 35, and they have an average of 5-7 years of seniority at Blue Cross/Blue Shield. They attend class on their own time, usually immediately after the work day.

People who start the program with relatively few high school credits can select a life experience component where they are awarded credit after a portfolio presentation of skills or knowledge acquired since leaving school. The Continuing Education Institute does some pre- and post-program diagnostic testing for referral and placement.

This program represents the most distant relationship between the funder and the vendor. In this case the funder has made a program available to employees with the simple goal of allowing them to complete their high school academic requirements. The funder provides the program free of charge to employees on their own time. To the extent that most of the participants are clerical

staff and a sound high school background includes skills clerical workers need, the program is job related. However, the funder has not exercised any influence over any aspect of the training, leaving all aspects of assessment, testing, and training to the provider.

An important goal of this program is to reduce employee turnover, and formal evaluation has shown that retention in the company improves after completion of the program. Graduates and participants express greater job satisfaction, and immediate supervisors report greatly improved job performance. Word of mouth has been the most effective recruiting tool because it is so positive.

Morale in the program is strong. One of the high points for students comes at graduation, which is attended by the president of the company.

Comprehensive Competencies Program

In 1985, with support from the Ford Foundation, the Remediation and Training Institute developed, tested, and began the dissemination of a learning system called the Comprehensive Competencies Program (CCP). This program delivers individualized, competency-based instruction in a wide range of academic areas, including elementary reading and arithmetic, high school and college-level science, mathematics, humanities, social studies, and writing. The program is based on a hierarchical sequence of competency-based objectives with four levels of difficulty, beginning with initial "locater tests." Each learner's progress through the hierarchy of competencies is documented by the results of mastery tests. Test scoring, lesson assignments, recordkeeping, and reporting are fully automated.

CCP learning centers vary in size and setting, but all are equipped with a variety of print and audiovisual materials that span an array of subjects and ability levels. The emphasis is on self-paced, personal, and highly individualized instruction.

Class size, subject grouping, ability levels, and scheduling are largely irrelevant. Instruction can be on a "drop-in" or regularly scheduled basis, and participation can last as long as the learner takes to achieve the desired level of mastery.

At the end of the second quarter of 1986, there were 158 CCP learning centers in 28 states and the District of Columbia, serving over 5,000 learners weekly. One quarter were in regular secondary or postsecondary schools, with another substantial proportion located in adult basic education and job-training activities. The average CCP learning center occupied 1,350 square feet and had a maximum capacity for 31 learners.

CCP learning centers make heavy use of computer hardware and software for instructional purposes, as well as a variety of audiovisual equipment such as tape recorders and videotape equipment.

The primary emphasis of instruction is on intermediate competencies--those at fifth- through eighth-grade skill levels, usually in developmental reading and intermediate mathematics. According to reports from the various learning centers around the country, about one quarter of those finishing CCP acquired a high school diploma or GED. The program developers claim very high gain rates, even with severely disadvantaged learners, and very positive perceptions by learners.

The CCP is offered primarily by schools and public agencies, and 81 percent of these centers received Job Training Partnership Act funds in the first quarter of 1986. These funders have no

particular goals related to a technology comparable to Onan or Polaroid. CCP is designed to be a relatively self-contained curriculum, complete with assessment, testing, and lessons. Whether the CCP lessons could be modified to reflect the particular skills required in a corporate setting as a resource for in-house basic skills training could only be revealed by a more detailed analysis. Such modification would make the program better suited to the interests of the company and would give the participants a feeling that the lessons are teaching them useful information and skills.

Similarly, the treatment of the assessment and testing aspects of the program would have an impact on employee acceptance of the program. Confidentiality in the assessment process would be a key factor in employee perceptions of this program as a threat or a benefit.

Although provision of education at the workplace is a multifaceted problem, the physical circumstances of the learning center in terms of its size are subject to the very definite and basic constraint of how much money the funder wants to spend. The equipment of the center depends on the money and on the spending priorities of the provider. In every case, space has been made available at the workplace to eliminate the time it takes to travel to classes and thus make the employee's time commitment more manageable.

Of the cases reviewed here, Polaroid undoubtedly has the largest population participating in basic skills training. In this case and in the case of Cummins, it is difficult to distinguish a basic skills learning center from learning centers for technical training because the two types of training are carried on side by side. A major difference between Cummins and Polaroid is the use of computer-aided instruction at Cummins. This difference may result in part from the generally narrower purpose of the Cummins program. Staff of the latter also have chosen to use computer-aided learning because computers were already available. Polaroid requires more flexibility in the instructional methods it employs because of the breadth of its program and the large numbers of employees involved. Despite the similarity of goals and orientation, the scope and size of the programs result in different equipment requirements for the learning centers. The priority at Polaroid is providing a good teaching staff and developing its own in-house materials using ordinary classroom equipment.

The Academy's learning center is split between the plant and the union halls. As the program has grown and become a benefit valued by many employees, money has become available from the UAW-Ford joint partnership to expand the learning center, and plant management has cooperated in setting aside space in the plant the better to house the program. The priority at the Academy is also for in-house materials and a highly educated staff, rather than for computer-aided instruction.

An additional dimension to the Academy, which it has in common with the Comprehensive Competencies Program, is defined instructional methods based on the findings of educational research. These methods underlie the spending priorities of each program. The differences between the approach of the staff at the Academy and the computer-based instruction advocated by the author of CCP are not due to budget constraints but different beliefs about how people learn. The priority of the CCP program is the use of a computer-based assessment and lesson program assisted by "modestly paid" staff.

The learning center at Onan is not a dedicated training space. This may be because Onan is small, with little money for remodeling. An existing conference room and employee lunch room double as the learning center. The equipment is also very basic. As at Polaroid and the Academy, priority is on staff and materials oriented toward using workplace vocabulary, examples, and problems.

Finally, although Blue Cross/Blue Shield of Massachusetts provided space for classes, it chose a provider to help employees complete their high school education using traditional instructional methods. The learning center is a space to which the vendor sends a teacher to teach.

Learning Centers: A Summary

The preponderance of the evidence gathered indicates that successful learning centers for basic skills generally rely on involved and competent teachers who develop materials based on the job-related experiences of participants and who do not need expensive equipment such as personal computers to educate the participants.

There seems to be no necessary connection between computer-based learning and an overall corporate training strategy; on the contrary, a less costly instructional technology may allow the development of materials that are tailored to the needs of training or job skill development in a particular setting. The instructional philosophy of the Academy at Ford/Ypsilanti explicitly excludes the use of a learning system developed by an outside vendor. The use of highly developed computer-based learning systems may be most appropriate for large numbers of learners, where the costs can be amortized over a long period of use with many participants and where the fundamental skills instruction will be followed by more job-specific training.

There seems to be no necessary connection between the use of an outside vendor of educational services and the development by the vendor and the employer of a curriculum that is tailored to the needs of an individual employer. Polaroid relies heavily on in-house instruction and programs, but Onan uses an outside vendor for in-house instruction. Ford/Ypsilanti uses instructors who work in a plant setting, but who are employed by a neighboring university. Massachusetts Blue Cross/Blue Shield makes available a very traditional high school diploma program at the end of the work day, but not always located on-site and whose participants are not necessarily Blue Cross/Blue Shield employees.

Many of the components of an instructional program--staff, curriculum, schedule, instructional strategies, and location--can be combined in different ways to suit different situations. Some successful basic skills programs are highly innovative in instructional techniques, but innovative is not synonymous with computer-based. The innovative curriculum of the Reading Academy is not high tech; the innovative curriculum at Cummins is. The high school diploma program at Massachusetts Blue Cross/Blue Shield is not innovative in its curriculum or instructional technique, but it is clearly adapted to the needs of adult learners and the company. Some basic skills programs make use of extensive pretesting, evaluation, and monitoring, whereas other successful programs do not. One common element is management recognition of the benefits of an educated work force. Table 13 summarizes some common elements of company learning programs.

Education in the Manufacturing Environment

The following are some dimensions common to the basic skills programs discussed here:

- The origin of the program by the funder from which comes a set of goals and the organization of the program
- The role of the provider that, constrained by the resources of the funder, uses the funder-provided learning center in which its staff use equipment and materials to implement the instructional methods and any assessment or testing

TABLE 13

COMPARISON OF COMPANY LEARNING PROGRAMS

Company	Linked To Corporate Goals	Linked To Technology	On Work Time	Assessment Type	Credential Availability	Rewards
1. Cummins	at the local level	directly	yes	formal	no	assists with promotion
2. Polaroid	yes	yes	combination	formal	yes	certifies for promotions and raises
3. UAW-Ford	joint	indirectly	no	informal	yes	intrinsic
4. Onan	yes	directly	no	informal	no	indirect
5. Blue Cross/ Blue Shield	yes	no	no	formal	yes	indirect

- Employee participation that is based on how employees perceive participation will benefit them personally and on the job

The four programs in manufacturing environments are Cummins, Polaroid, UAW-Ford Ypsilanti, and Onan. Of these four, the Academy at UAW-Ford Ypsilanti stands out as a program that was not created specifically to support job-related skills needed by the company. Rather, it was created to meet the personal development goals of employees. This difference in goals is not a complete dichotomy. For the employees at these four locations, the workplace is a large part of their lives, and their advancement, for the sake of their personal satisfaction and the material well-being of their families, is an important element of their self-esteem. Hence, the creation of educational programs by companies to provide job-related skills that are tickets to job advancement is a real benefit to the employees who take advantage of them. These programs can also generate spillover effects by enhancing the employees' skills for personal purposes.

There is a complex of factors that in the end determine how widely the program is accepted, how widely the benefits are felt among employees, and ultimately how much the company benefits from the program. These factors may be summed up by linking together the following complementary elements in the organization of an educational program:

- The needs of employees for skills
- The employees' expectations of success in the educational program
- The rewards available to employees for success in the program

In most cases, educational programs are initiated in response to a perceived need of employees for skills, and there are rewards of various kinds explicitly promised at the end of the program. On the other hand, dealing with employee expectations about their success in the program and rewarding employees proportionately for the work they put in are seldom considered carefully.

Polaroid seems to have an excellent formula for both of these tasks. The Polaroid experience is not directly transferable to other situations because it has a centralized program with most of its employees geographically close to the central facility and because of its particular business. There are important lessons to be learned from Polaroid, nevertheless.

Polaroid employees have been willing to go through needs assessment and testing on the knowledge they have learned in class. The Cummins program involved testing, but the number of employees was small and the variety of subjects limited. Polaroid teaches and tests a wide range of skills. The reason for the wide acceptance of the Polaroid program is that the rewards for success are very large, and the employee's need for skills is assessed. Employees at Polaroid have control over the records of their academic performance and the records of their skill inventory.

Polaroid respects employees' sensitivities in the need assessment area and fosters employees' expectations of success in their classes in the following ways:

- Employees are placed carefully so that they can feel confident of their success.
- Academic problems employees may have are not disclosed.
- Testing permits them to show what they know and thus loses its negative connotation.

The rewards of the Polaroid program are threefold:

- The wide range of offerings at Polaroid gives employees the opportunity to meet personal development goals, which may be enhanced by the pride and confidence gained in passing tests.

- Employees use the credentials developed in the program to advance in the company by proving they meet the skill criteria set for the job.

- When a skill is part of the skill criteria for the employee's job, the employee will be permitted to learn the skill on company time, regardless of the subject.

Each element is crucial. If individual assessment were not available, along with a range of classes matching the ability of the employees, then many employees would not participate regardless of the rewards because of their fear of failure. If the rewards were not as great, then many would not participate because they would have little incentive. The rewards would not be possible without testing in order to establish credentials.

The Onan and UAW-Ford Ypsilanti programs match participant skills to instruction in an informal way by having instructors gauge the participants' ability and teach the class accordingly. These programs deal with fear of failure by not testing. Consequently, the rewards of completing the courses are personal satisfaction and the hope that a new skill will pay off on the job. Because the Onan program is a company program, it is integrated with technical training in the sense that MEP is followed by technical training.

The Polaroid case indicates that more attention to linking employee skill needs, academic success, and rewards can result in increased voluntary participation in training of all types. By this example, technical training and basic skills education need not be taught separately, but rather complement each other. Companies that have both basic skills training and technical training should seriously consider linking basic skills to job skills and rewarding mastery of these skills as strongly as mastery of technical skills is rewarded. Companies that do their training piecemeal and sporadically rather than taking steps to integrate basic skills and technical training with work life, as Polaroid has done, are missing a chance to increase both the skills and motivation of their employees.

These case studies provide a microlevel picture of how carefully tailored programs can be implemented in a specific firm for different types of employees. It would, however, misrepresent reality if the impression conveyed is that the retraining/upgrading landscape is flat, just covered with such programs. That is, of course, not the case. Many major corporations have long supported programs such as these on their corporate national level; on the local level, a program might resemble one of the case studies very closely. For many years AT&T has provided an example of this type of program.

Several other developments are interesting. One is rather specialized since it is a multi-employer model. The need for integration within a facility as technology is implemented was stressed in these cases as well as the emerging need for coordination among suppliers to a major end-user of supplies. An interesting example of the integration across supplier and user firms around training was given in a recent essay on technology and training (*People and Automation* 1986), which described the award of a grant from the Governor's Office of Job Training in Michigan to a nearby community college. The grant enabled the college to provide statistical process control training to employees of many supplier firms so that those firms could meet the new

quality demands of user firms. Those user firms were moving to just-in-time systems that required low-defect, high-quality parts, which pressed a new training demand upon smaller, local supplier firms.

Another example, tying two firms together in an increasingly common set of activities, featured an auto stamping plant newly committed to CAD/CAM. The need was thus increased for considerable reduction in variance in composition of metals supplied by firms acting as vendors to this stamping plant. To facilitate matching supply and demand in the metal provision process, special training was provided to employees of both firms by a local training institution so that they could develop and maintain quality control problem-solving groups composed of employees from both firms. In this case, workers from the supplier and user firm could address problems early and relationships could be developed that would permit easy communication, common understanding with a result of increased productivity, and reduced defects on both sides of the supplier-user relationship.[1]

In response to an example of the difficulties encountered by small companies in meeting education and training needs, an educational maintenance organization was developed several years ago. This organization, now called the Business Training and Development Center, brought the resources of several colleges and universities together to meet the needs of employees of 181 small companies (Charner and Rolzinski 1987). Many other examples of productive interactions between business, industry, and education--ranging from English as a second language to economic and computer literacy--show that such programs provide valuable learning experiences for all of the partners.

Perhaps the most interesting step toward a systematic response to prevention of obsolescence has been taken in an innovative way. The new joint labor-management programs first addressed the pressing needs of former autoworkers seeking new careers and requiring training. These programs were forged in the depth of the recession in 1982 in a collective bargaining agreement between Ford Motor Company and the United Automobile Workers, followed shortly thereafter by General Motors and the UAW. The strength of a well-designed, jointly developed and administered response to a plant closing is shown in the case of the San Jose UAW-Ford program (Hansen 1987). Additional research, focused on massive layoffs rather than plant closing training responses is currently in progress and will be published in 1988 (Gordus and Yamakawa forthcoming). This report will take another look at such joint retraining programs. However, the real growth in the joint labor-management education and retraining programs is now found within the establishments. At least one overview of four joint labor-management programs at the national level--UAW-Ford, UAW-GM, UAW-Chrysler, and Communication Workers of America-AT&T (CWA-ATT)--has been undertaken (Ferman 1987). These programs, however designed, impose some national guidelines upon local program developments. Some efforts, such as CWA-ATT, are fairly clearly and narrowly defined for the careers of employees within the firm, whereas others focus more broadly. The UAW-Ford program (Abt Associates 1986) is driven not by the need of the employer to prevent obsolescence but by the needs and interests of workers who wish to enhance their own lives. Within just these four programs, nearly 1 million American workers have available wide ranges of education and training opportunities to promote individual growth and to enhance skills.

It is likely that the evaluation of these joint labor-management worker training and education programs in terms of employee growth and development, labor-management cooperation, and productivity will be the most closely watched development in education and training as well as labor

[1]Based on an interview with education and training staff at a stamping plant in Ohio held by J. P. Gordus in February 1986.

management relations over the coming decade. These programs, developed and jointly held by traditional adversaries, are being offered in industries most seriously affected by the economic changes of the 1970s to workers who have often been considered uninspired by the prospect of education. If these programs succeed, the question of whether obsolescence through retraining can be prevented will have been answered. These programs are just beginning, and their results will not be seen until the 1990s. It is to be hoped that they will succeed since these evaluations are crucial not just to these companies, the unions, the educational institutions involved, and the workers, but to the health of the American economy and the stability of American society. If these and other programs succeed, the details will be found in educational journals and books. If such programs fail, those results will be visible across the American landscape as plants close and local economies decline.

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The preceding chapters of this report summarized some features of the current economic and demographic environment that support the contention that the skills of many employed and unemployed workers are either obsolete or likely to become obsolete. Although the impact of a national skills deficit upon productivity cannot be specified, there appears to be general agreement that upgrading of skills is necessary.

Some detail about the conditions leading to the permanent dislocation of many American workers was presented, with an account of consequences of this dislocation. Particular attention was paid to the revelation of deficiencies--not just in technical skills either newly required in existing jobs or skills required for qualification for newly created jobs--but in basic skills among an alarming fraction of dislocated American workers. An account was then given of the patchwork set of arrangements that were developed to transmit skills to dislocated workers. In general, it was clear that the public and private response to dislocation was ineffective since so few were served, and only a minority of those served received skills training of any type.

Little is known about the precise qualifications of Americans who are currently employed, since years of educational attainment as a measure clearly has very different meanings for different groups of workers. However, it was considered highly likely that basic general and technical skills deficiencies characterize many of the employed. The trend toward various types of automation and computer-aided production and services combined with a long-term trend toward a heavier reliance upon skilled versus unskilled workers in many industries was outlined. How employers' needs for workers who are both educated and educable are met in the workplace was described, and several case studies of how basic skills deficiencies are remediated as the foundation for further skills training were presented.

As innovative and successful as some programs are, it was clear that the concentration of all types of education and training in the workplace is in larger corporations. However, innovative programs involving consortia of companies and consortia of educational institutions have been developed to respond to the needs of smaller companies without large human resource or training departments.

What patterns emerge from this review?

- Although Americans, on average, appear to have reached higher and higher levels of educational attainment (75 percent of American workers have finished high school in contrast to 50 percent in the 1960s), serious educational deficiencies continue to be identified.

- Estimates vary, but it is generally agreed that educational impairment in terms of low levels of functional competency characterize about 20 percent of the younger working population.

- Among the unemployed, considering both the dislocated workers and those who have never had a productive labor force attachment, lack of functional competence is much higher.

- Potential new entrants to the labor market have serious educational deficiencies, with one in seven American 17-year-olds identified as deficient.

- Only about 1.5 percent of those displaced from employment after 3 years with the same employer and technically eligible for retraining actually received retraining in 1983. In JTPA's best recent year, 7 percent of the eligibles received some service through federally funded JTPA programs.

- The most successful of these programs, in terms of post-program wage raises, were operated by employers and unions. Those programs generally were associated with large corporations and progressive unions.

- Programs that do work well at any level are carefully designed, comprehensive, and depend upon formal or informal assessment, reinforcement, and training customized two ways--to the needs of the participants and the needs of local employers.

- Technology can be deployed so as to eliminate and deskill jobs. It can also be deployed to better advantage when basic and technical skills of workers permit their participation in the implementation of technology.

- Most unsuccessful programs, in every sector, targeted to any segment of the population needing training, have one common characteristic--the use of the "quick fix."

- Although training will not produce jobs, the lack of training in available workers will impel employers to design work to create "Mac-jobs." Those low-skill jobs probably will not produce sufficient income to retain workers who would do better on welfare.

- Education does affect income and consequently the general level of wealth in the society positively, but those returns do not appear quickly.

- The cycles of funding, program expectations of quick success, and cycles of training are all designed to promote quick and cheap programming that ultimately is not cost-effective.

- Since employers are the logical providers of post-hire training, tax credits similar to those for capital investment in equipment should be available.

- Institutional rigidities that are often held responsible for many of the problems in the American economy are also characteristic of educational institutions.

- Successful programs for employed or unemployed workers are designed to remediate existing deficiencies as a prelude to more technical and skills training.

- Successful programs for employed or unemployed workers depend on good information about specific skills needed for specific tasks.

- Successful programs for employed or unemployed workers generally are also examples of cases where institutional arrangements are unusual and where territoriality and tradition are minimized.

The following recommendations derive from this summary. Some have been made before; others are new.

- Some form of tax credit should be available to companies that provide training for employees; it should be similar to investment credits for equipment.

- A system that provides good, local labor market information should be available to employees, job seekers, and training institutions.

- Employee tuition assistance programs, encouraged by tax credits, should have attached to them "credits" for certain types of routine services that employees should be encouraged to use. An educational "checkup" conducted in a nonthreatening way, which could result in an appointment with a counselor to set up a plan to acquire missing skills or to upgrade existing skills, even through short-term tutoring, is one approach.

- Support systems within workplaces, in terms of study areas, management recognition of academic progress, and rewards for learning-associated career advancement, are productive and generally inexpensive.

- Neutral environments for career services for all Americans should be available. Currently, such services are expensive when obtained privately, since they are generally sequestered to academic institutions for new labor force entrants and to clearly labeled agencies for the unemployed. However, vocational skill building and smooth career transitions are crucial not only for individuals but for the economy as a whole. A new project sponsored by the Kellogg Foundation, which supports career services in libraries as pilot projects in four states, is a good start.

- Such support systems at the workplace and in the larger society serve to emphasize the fact that change makes everyone's skills obsolete and that education and training are paths to success, not penalties for failures such as job loss.

- Individual Training Accounts, such as a voucher system for vocational training, appear to be one excellent method of dealing with the inequities between employees in large and small firms. However, the true law of supply and demand--that where there is a supply of money, some vendor will appear in order to demand it--requires that some additional services be made available and required.

- If the voucher system is implemented, even experimentally, any individual seeking to use a personal account should be required to participate successfully in an adult education evaluation program. These workshops would explain the educational system and provide individuals with the tools to make good personal and institutional choices.

The findings from the case studies and reviews provide some background for recommendations, although some of the recommendations have been made before and many could have been made without even a summary of recent literature and programs. Broad policy recommendations, case studies, and reviews can suggest both important program elements and organizational steps that can be taken. For example, supported and supportive remediation programs are clearly important for many at work and out of work, as existing programs show. For such programs to succeed, assessment is required, and both formal and informal assessment can work well in different settings. Two sets of suggestions follow. The first is a menu of program elements, encompassing a relatively comprehensive

work-related education/training development program. The second is a repertoire of organizational and interorganizational strategies that have been found effective in implementing programs of this type.

Program Elements for Skills Obsolescence Prevention

From the case studies and a review of programs, several elements emerge as desirable features, although not all elements are contained in any one program:

- A counseling/educational guidance component that provides adults with the information and skills required to develop a good plan of action for their own career and educational development
- An assessment system that enables educational institutions and employers to pinpoint the areas where training and upgrading are needed; such a system should be as nonthreatening as possible
- A support system that provides for aid in the form of tuition assistance; some time off for learning, when possible; a study site within a workplace to be used at lunch and breaktime; assistance with child care; development of a convenient learning site (in the workplace if possible); and recognition among managers and co-workers of the achievements of those who are involved in education
- A basic skills program, which may require another name, since an essential feature must be freedom from the stigma that may be attached to the need for remediation
- A vocational skills program, which should integrate learning as far as possible with practical application in the workplace
- A general skills program, which should include communication and organizational skills
- Management development programs

Organizational Development Steps for Skills Obsolescence Prevention

Some other aspects of successful programming, focused on the organizational rather than educational aspects of the necessary partnerships, also emerged. They include the following:

- Identification of differences between educational institutions and corporate institutions in terms of missions, goals, and climate so that respect for differences can be developed and supported
- Identification of mutual goals and objectives, for example, both the company and college identify higher skill levels as important, albeit for different reasons
- Clear demarcation of roles and responsibilities, with ongoing discussions of these so that changes can be observed and accommodated

- Multiple contacts among many levels of the organization so that knowledge of each other's plans and problems can be acquired

- Careful communication on both sides, which involves the development and maintenance of procedures for information sharing to minimize surprises

- Flexibility, which depends upon both trust and knowledge of what can and cannot be done in each organization, and which sometimes requires attempts to move one step beyond what "can" be done

- Rapid responses to concerns and complaints from all partners

- The development of a reward and recognition system for learners and for those in the companies and educational institutions who are working on these programs

Assessing Current and Future Efforts to Prevent Skills Obsolescence

How do we know, in any specific instance, whether the few programs now in place actually do prevent obsolescence? The measures are not educational; they are related to the productivity of employers and how companies fare in the marketplace. Many other variables, besides increasing competence of employees, can account for these successes and failures.

However, there are a few indicators obvious to the alert observer in companies where a good process is underway. People keep their schoolbooks in their lockers and carry them around openly because so many other people do. Hourly and salaried employees take onsite courses together, and perforce, study together and learn more about each other. Continuing competition for scarce onsite classroom and training space activities is a good indicator too. Families agree to limited TV hours so that everyone can complete the assignments. The long-term payoff to preventing obsolescence by taking concerted action to provide education and training to the employed and unemployed is the example given to children who see that learning is always a critical part of human existence.

Conclusion

On the surface, it may seem that the major lesson to be learned from these reviews and case studies is that skills upgrading appears to encounter so many constraints in the unemployment situation that job-search skills training is more cost-effective. Conversely, for a variety of good reasons, skills obsolescence can best be prevented in the workplace through a series of educational endeavors ranging from counseling and assessment through basic and advanced skills training. Service delivery can be accomplished onsite and offsite, depending upon circumstances. Most of the information reported here supports these conclusions.

However, there are other underlying issues and considerations. What characterizes the unemployment situation is uncertainty and time limitations. Under such circumstances, it is only reasonable that a reactive strategy should be adopted, one that helps solve an unemployment problem. Only infrequently can the need of dislocated workers for relatively rapid reemployment be met at the same time as the need to enhance the skills of the work force. Where there are available jobs

requiring training and a surplus of workers suitable to benefit from this training, such a strategy can work. Unfortunately, such happy coincidences are not common, except, of course, within the workplace.

Within the workplace, the availability of information about the capacities of the work force and the skills needed to remain competitive provides the foundation for a proactive strategy. In some of the case studies reported here, there is evidence that human resource issues are closely linked to corporate long-range goals. That is the first step toward a proactive, preventive strategy. When corporate goals and education and training goals are tied together, the beginning of the prevention process can take place, as partnerships are developed between workers, employers, and education and training institutions to meet the needs of a changing economy.

REFERENCES

Abt Associates. *UAW-Ford Employee Development and Training: A Case Study of Two Program Approaches.* Cambridge, MA: Abt Associates, 1986.

Ayres, R. V., and Miller, S. M. *Robotics Applications and Social Implications.* Cambridge, MA: Ballinger Press, 1983.

Barth, Michael C., and Reisner, Fritzie. *Worker Adjustment to Plant Shutdowns and Mass Layoffs: An Analysis of Program Experience and Policy Options.* Washington, DC: ICF Inc., 1981. (ERIC Document Reproduction Service No. ED 209 478).

Berlin, Gordon, and Sum, Andrew. "American Standards of Living, Family Welfare, and the Basic Skills Crisis." Based on a speech delivered by Gordon Berlin at a conference sponsored by the National Governors' Association, December 1986.

Blair, Larry M. "Worker Adjustment to Changing Technology Techniques, Processes and Policy Considerations." In *American Jobs and the Changing Industrial Base,* edited by E. L. Collins and L. D. Tanner. New York: Harper and Row, 1984.

Bluestone, Barry, and Harrison, Bennett. *Capital and Communities: the Causes and Consequences of Private Disinvestment.* Washington, DC: Progressive Alliance, 1980.

Bluestone, Barry, and Harrison, Bennett. *The Deindustrialization of America.* New York: Basic Books, 1982.

Carnevale, Anthony P., and Goldstein, Harold. *Employee Training: Its Changing Role and an Analysis of New Data. National Issue Series.* Washington, DC: American Society for Training and Development, 1984.

Charner, Ivan, and Rolzinski, Catherine A. "New Directions for Responding to a Changing Economy: Integrating Education and Work." In *Responding to the Educational Needs of Today's Workplace. New Directions for Continuing Education no. 33,* edited by Ivan Charner and Catherine A. Rolzinski. San Francisco: Jossey-Bass, 1987. (ERIC No. EJ 348 684).

CSR Associates. *Study of Selected Impacts of Dislocated Workers Programs: Final Report.* Arlington, VA: CSR Associates, Inc., 1986.

Devens, Richard M. "Displaced Workers: One Year Later." *Monthly Labor Review* 109, no. 7 (July 1986): 40-44. (ERIC No. EJ 337 113).

Ferman, Louis A. "Joint Union Management Education-Training Program." Presented at the Institute for Labor and Industrial Relations series, Ann Arbor, Michigan, October 12, 1987.

Forester, Tom, ed. ***The Microelectronics Revolution.*** Cambridge, MA: MIT Press, 1981.

Forester, Tom, ed. ***The Information Technology Revolution.*** Cambridge, MA: MIT Press, 1985.

Forester, Tom. ***High-Tech Society.*** Cambridge, MA: MIT Press, 1987.

General Accounting Office. ***Dislocated Workers, Extent of Business Closures, Layoffs and the Public and Private Response.*** Washington, DC: Human Resources Division, U.S. General Accounting Office, 1986. (ERIC Document Reproduction Service No. ED 275 859).

General Accounting Office. ***Dislocated Workers: Local Programs and Outcomes under the Job Training Partnership Act.*** Washington, DC: Human Resources Division, U.S. General Accounting Office, 1987. (ERIC Document Reproduction Service No. ED 281 026).

Ginzberg, Eli. "The Mechanization of Work." ***Scientific American*** 247, no. 3 (September 1982): 66-75. (ERIC No. EJ 267 485).

Gordus, Jeanne P., and Yamakawa, Karen. ***Retraining Experiences and Outcomes: A Followup Study.*** Kalamazoo, MI: W. E. Upjohn Institute for Employment Research, forthcoming.

Gordus, Jeanne P.; McAlinden, Sean; Yamakawa, Karen; and Conboy, B. M. ***The Saginaw Valley Model: The Tri-County Labor Needs Survey Final Report.*** Ann Arbor: University of Michigan, 1984.

Halle, David. ***America's Working Man: Work, Home, and Politics among Blue-Collar Property Owners.*** Chicago: University of Chicago Press, 1984.

Hansen, Gary B. ***Two Years Later: A Report on the UAW-Ford San Jose Plant Closing Program.*** Logan: Center for Productivity and Working Life, Utah State University, 1987.

Hunt, H. Allen, and Hunt, Timothy L. ***Human Resource Implications of Robotics.*** Kalamazoo, MI: W. E. Upjohn Institute for Employment Research, 1983. (ERIC Document Reproduction Service No. ED 228 547).

Jacobs, James. ***Training and Public Policy: Final Report.*** Ann Arbor, MI: Industrial Technology Institute, 1987.

Jarrett, M. L.; Kulik, Jane; and Smith, D. Alton. ***An Evaluation of the Displaced Worker Demonstration Programs. Report to the U.S. Department of Labor.*** Cambridge, MA: Abt Associates, 1983.

Kulik, Jane; Smith, D. Alton; and Stromsdorfer, Ernst W. ***The Downriver Community Conference Economic Readjustment Program.*** Cambridge, MA: Abt Associates, 1984.

Levy, Frank. ***Dollars and Dreams: The Changing American Income Distribution.*** New York: Basic Books, 1987.

Lipsky, David B. "Interplant Transfer and Terminated Workers: A Case Study." ***Industrial and Labor Relations Review*** 27, no. 3 (January 1970): 197.

Office of Technology Assessment. ***Technology and Structural Unemployment: Reemploying Displaced Adults***. Washington, DC: Office of Technology Assessment, U.S. Congress, 1986. (ERIC Document Reproduction Service No. ED 268 264).

People and Automation. Report of the Committee on the Effective Implementation of Advanced Manufacturing Technology. Special Report no. 787. Washington, DC: National Research Council, 1986.

Podgursky, Michael, and Swaim, Paul. "Job Displacement and Earnings Loss: Evidence from the Displaced Worker Survey." ***Industrial and Labor Relations Review*** 41, no. 1 (October 1987): 17-29.

Shultz, George P., and Weber, Arnold R. ***Strategies for the Displaced Worker***. New York: Harper and Row, 1966.

BIBLIOGRAPHY

Displaced Workers

Assessment of the Implementation and Effects of the JTPA Title V Wagner-Peyser Amendments: Phase I Final Report. Silver Spring, MD: Macro Systems, Inc., January 1985.

Assessment of the Implementation and Effects of the JTPA Title V Wagner-Peyser Amendments: Phase II Final Report. Silver Spring, MD: Macro Systems, Inc., January 1985.

Betsey, Charles L.; Hollister, R. G., Jr.; and Papageorgiou, M. R. *Youth Employment and Training Programs. The YEDPA Years.* Washington, DC: National Academy Press, 1985. (ERIC Document Reproduction Service No. ED 265 245).

Brady, Elaine. *An Overview of the New Job Training System.* Washington, DC: National Alliance of Business, 1984. (ERIC Document Reproduction Service No. ED 239 088).

Carey, Max, and Eck, Alan. "How Workers Get Their Training." *Occupational Outlook Quarterly* 28, no. 4 (Winter 1984): 2-21. (ERIC No. EJ 311 058).

Cook, R. F.; Beatty, R. L.; Hunt, H. A.; Liebschutz, S.; MacLachlan, G. E.; MacLachlan, B.; MacManus, S. A.; Morlock, M.; Palmer, K.; Pattakos, A.; Rawlins, V. L.; Rupp, K.; Turnage, W.; and associates. *Implementation of the Job Training Partnership Act: Final Report.* Rockville, MD: Westat, Inc., 1985. (ERIC Document Reproduction Service No. ED 275 879).

Cook, R. F.; Fisher, C. J.; Hunt, H. A.; Liebschutz, S.; MacLachlan, G.; MacManus, S. A.; Morlock, M.; Palmer, K.; Pattakos, A.; Rawlins, V. L.; Rupp, K.; Turnage, W.; and associates. *Transition Year Implementation of the Job Training Partnership Act.* Rockville, MD: Westat, Inc., 1985. (ERIC Document Reproduction Service No. ED 275 878).

Cook, R. F.; Rawlins, V. L.; Reesman, C. J.; Rupp, K.; Turnage, W. M.; and associates. *State Level Implementation of the Job Training Partnership Act.* Rockville, MD: Westat, Inc., 1984. (ERIC Document Reproduction Service No. ED 275 876).

Cook, R. F.; Reesman, C. J.; Rupp, K.; Turnage, W.; and associates. *Early Service Delivery Area Implementation of the Job Training Partnership Act.* Rockville, MD: Westat, Inc., 1984. (ERIC Document Reproduction Service No. ED 275 877).

Displaced Workers, 1979-1983. Bulletin 2240. Washington, DC: Bureau of Labor Statistics, U.S. Department of Labor, July 1985.

The Downriver Community Conference Economic Readjustment Program: Overview and Summary. Cambridge, MA: Abt Associates, Inc., September 30, 1984.

GAO Testimony–Job Training Partnership Act, Title III. Washington, DC: Dislocated Worker Programs, General Accounting Office, n.d.

An Impact Evaluation of the Buffalo Dislocated Worker Demonstration Program. Princeton, NJ: Mathematica Policy Research, Inc., 1983.

Is the Job Training Partnership Working? Washington, DC: National Alliance of Business, 1985.

Job Corps Process Analysis, Final Report. Princeton, NJ: Mathematica Policy Research, Inc., 1982.

Mallar, Charles. *Evaluation of the Economic Impact of the Job Corps Program. Third Followup Report.* Princeton, NJ: Mathematica Policy Research, 1982. (ERIC Document Reproduction Service No. ED 241 725).

Retraining Delaware's Dislocated Workers: Final Impact Evaluation. Bloom Associates, Inc., 1984.

The Role of Small Business in Job Creation and Training. Testimony before the House Republican Research Committee. Washington, DC, June 22, 1984.

State Job Training Coordinating Councils. Chapel Hill, NC: MDC, Inc., 1985.

Study of the FY 1983 Summer Youth Employment Program. Silver Spring, MD: Macro Systems, Inc., 1984.

Study of the JTPA Eight Percent Education Coordination and Grants Set-Aside and the Three Percent Set-Aside Training Program for Older Individuals. Washington, DC: National Governors Association, 1986.

Walker, Gary; Feldstein, Hilary; and Solow, Katherine. *An Independent Sector Assessment of the Job Training Partnership Act: Phase II.* New York: Grinker, Walker, and Associates, 1985.

Walker, Gary; Grinker, William; Seessel, Thomas; Smith, R. C.; and Camer, [illegible]nce. *An Independent Sector Assessment of the Job Training Partnership Act: Phase I.* New York: Grinker, Walker, and Associates, 1984.

General

Abbott, W. "College/Labor Union Cooperation." *Community and Junior College Journal* 47, no. 7 (April 1977): 48-51. (ERIC No. EJ 160 788).

AFL-CIO. "Services for the Unemployed." A Brochure on How to Organize and Utilize a Community Services Committee. Washington, DC: Department of Community Services, AFL-CIO, December 1980.

American Association for Higher Education. *Partnerships with Business and the Professions. Current Issues in Higher Education, no. 3.* Washington, DC: American Association for Higher Education, 1981. (ERIC Document Reproduction Service No. ED 213 325).

American Association of Community and Junior Colleges. *Putting America Back to Work: The Kellogg Leadership Initiative.* Washington, DC: American Association of Community and Junior Colleges, 1984. (ERIC Document Reproduction Service No. ED 245 738).

Anderson, R. E., and Darkenwald, G. G. *Participation and Persistence in American Adult Education.* New York: The College Board, 1979. (ERIC Document Reproduction Service No. ED 181 186).

Anderson, R. E.; Kasl, E. S.; and associates. *The Costs of Financing Adult Education and Training.* Lexington, MA: Lexington Books, 1982.

Aslanian, C. B., and Brickell, H. M. *Americans in Transition: Life Changes as Reasons for Adult Learning.* New York: The College Board, 1980. (ERIC Document Reproduction Service No. ED 195 687).

Barton, P., and the National Institute for Work and Learning. *Worklife Transitions.* New York: McGraw-Hill, 1982.

Boaz, R. *Participation in Adult Education. Final Report, 1975.* Washington, DC: National Center for Education Statistics, 1978. (ERIC Document Reproduction Service No. ED 159 473).

Booth, A. "A Demographic Study of Non-Participation." *Adult Education* 11 (1961): 223-229.

Boshier, R. W., and Baker, G. "Effects of Fees on Clientele Characteristics and Participation in Adult Education." *Adult Education* 29, no. 3 (Spring 1979): 151-169. (ERIC No. EJ 210 391).

Botsman, P. "The Learning Needs and Interests of Adult Blue Collar Factory Workers." Ithaca: New York State College of Human Ecology, Cornell University, 1975.

Brown, C. A. "Municipal Training Programs: 1975." *Urban Data Service Reports* & International City Management, 1975.

Buss, T. F., and Redburn, F. S. *Mass Unemployment: Plant Closings and Community Mental Health.* Beverly Hills, CA: Sage Publications, 1983.

Carp, A.; Peterson, R.; and Roelfs, P. "Adult Learning Interests and Experiences." In *Planning Nontraditional Programs,* edited by K. P. Cross, J. R. Valley, and associates. San Francisco: Jossey-Bass, 1974.

Charner, I. *Patterns of Adult Participation in Learning Activities.* Washington, DC: National Institute for Work and Learning, 1980. (ERIC Document Reproduction Service No. ED 200 725).

Charner, I.; Knox, K.; LeBel, A.; Levine, H.; Russell, L.; and Shore, J. *An Untapped Resource: Negotiated Tuition-Aid in the Private Sector.* Washington, DC: National Manpower Institute, 1978. (ERIC Document Reproduction Service No. ED 177 278).

Cook, R. F., and Turnage, W. M. "The New Federal-State Program to Train Dislocated Workers." *Monthly Labor Review* 108, no. 7 (July 1985): 32-35.

Craig, R, and Evers, C. "Employers as Educators: The Shadow Education System." In *Business and Higher Education: Toward New Alliances*, edited by G. Gold. San Francisco: Jossey-Bass, 1981.

Cross, K. P. "A Critical Review of State and National Studies of the Needs and Interests of Adult Learners." In *Adult Learning Needs and the Demand for Lifelong Learning*, edited by C. B. Stalford. Washington, DC: National Institute of Education, 1978.

Cross, K. P. "Adult Learners: Characteristics, Needs, and Interests." In *Lifelong Learning in America*, edited by R. E. Peterson and associates. San Francisco: Jossey-Bass, 1979.

Cross, K. P. *Adults as Learners*. San Francisco: Jossey-Bass, 1981.

Cross, K. P. "Continuing Higher Education in the 1980s." *Journal of Continuing Higher Education* 31, no. 1 (Winter 1983): 2-6.

Cross, K. P.; Valley, J. R.; and associates. *Planning Nontraditional Programs*. San Francisco: Jossey-Bass, 1974.

Darkenwald, G. G. "Continuing Education and the Hard-to-Reach Adult." In *Reaching Hard-to-Reach Adults. New Directions for Continuing Education, no. 8*, edited by G. G. Darkenwald and G. A. Larson. San Francisco: Jossey-Bass, 1980. (ERIC No. EJ 235 867).

Darkenwald, G. G., and Valentine, T. "Factor Structure of Deterrents to Public Participation in Adult Education." *Adult Education Quarterly* 35, no. 4 (Summer 1985): 177-193. (ERIC No. EJ 317 832).

Dearman, Nancy B., and Plisko, Valena W. *The Condition of Education, 1979 Edition*. Washington, DC: National Center for Education Statistics, 1979. (ERIC Document Reproduction Service No. ED 172 446).

Delker, Paul V. "State of the Art in Adult Basic Education." Paper presented to the National Adult Literacy Conference, Washington, DC, January 19, 1984. (ERIC Document Reproduction Service No. ED 241 698).

Eliason, C. "The Dislocated Worker: A New Challenge for Two-Year Colleges." In *Displaced Workers: Implications for Educational and Training Institutions*, edited by Kevin Hollenbeck, et al. Columbus: The National Center for Research in Vocational Education, The Ohio State University, 1984. (ERIC Document Reproduction Service No. ED 245 081).

Fisher, J. C. "Participation in Educational Activities by Active Older Adults." *Adult Education Quarterly* 36, no. 4 (Summer 1986): 202-210. (ERIC No. EJ 335 454).

Fisher, Jeffrey D.; Nadler, Arie; and Whitcher-Alagna, Sheryle. "Recipient Reactions to Aid." *Psychological Bulletin* 91, no. 1 (January 1982): 27-54.

Flaim, Paul O., and Sehgal, Ellen. "Displaced Workers of 1979-83: How Well Have They Fared?" *Monthly Labor Review* 108, no. 6 (June 1985): 3-16.

Fraser, B. *The Structure of Adult Learning, Education, and Training Opportunity in the United States.* Washington, DC: National Institute for Work and Learning, 1980. (ERIC Document Reproduction Service No. ED 200 723).

Freeman, R. "Troubled Workers in the Labor Market." In *The Federal Interest in Employment and Training. Seventh Annual Report.* Washington, DC: National Commission for Employment Policy, 1981. (ERIC Document Reproduction Service No. ED 230 698).

Goldberg, Marshall. "New Hope for the Dislocated." Paper presented at the Meeting of the Industrial Relations Research Association, Spring 1985.

Goldstein, H. *Training in Industry.* Washington, DC: National Institute for Work and Learning, 1980.

Goldstein, H. "Institutional Sources of Education and Training in the Adult Years." Unpublished paper, 1984.

Heisel, M. A.; Darkenwald, G. G.; and Anderson, R. E. "Participation in Organized Educational Activities among Adults Age 60 and Over." *Educational Gerontology* 6, no. 2 (March 1981): 227-240. (ERIC No. EJ 245 460).

Hunter, C. S., and Harman, D. *Adult Illiteracy in the United States.* New York: McGraw-Hill, 1979.

Johnstone, J. W. C., and Rivera, R. J. *Volunteers for Learning: A Study of the Educational Pursuits of American Adults.* Chicago: Aldine Publishing Co., 1965.

Jung, S.; Campbell, V.; and Wolman, J. "A Comparative Study of Proprietary and Nonproprietary Vocational Training Graduates." *Journal of Vocational Behavior* 8, no. 2 (April 1976): 209-224. (ERIC No. EJ 140 987).

Kemp, Florence B. *Noncredit Activities in Institutions of Higher Education for the Year Ending June 30, 1976.* Washington, DC: National Center for Education Statistics, 1978. (ERIC Document Reproduction Service No. ED 153 039).

Knox, A. B., and Videbeck, R. "Adult Education and the Adult Life Cycle." *Adult Education* 13 (1963): 102-121.

Koester, O. "Occupational Education at the Postsecondary Level--Future Market and Federal Policy Options." In *Higher Education in the 1980s: Declining Enrollments, New Markets and the Management of Decline.* Durham, NC: Center for Educational Policy, Duke University, 1979.

London, J. "The Influence of Social Class Behavior upon Adult Education Participation." *Adult Education* 20, no. 3 (Spring 1970): 140-153. (ERIC No. EJ 022 208).

London, J.; Wenkert, R.; and Haggstrom, W. C. *Adult Education and Social Class.* Berkeley: Survey Research Center, University of California, 1963. (ERIC Document Reproduction Service No. ED 003 010).

Lusterman, S. *Education in Industry.* New York: Public Affairs Research Division, The Conference Board, 1977. (ERIC Document Reproduction Service No. ED 195 636).

National Center for Education Statistics. *Survey of Participation in Adult Education 1978.* Washington, DC: National Center for Education Statistics, U.S. Department of Health, Education, and Welfare, 1979.

National Center for Education Statistics. *The Condition of Education, 1984 Edition.* Washington, DC: National Center for Education Statistics, U.S. Department of Health, Education, and Welfare, 1984.

Nelson, A. H. *Advancing Women's Careers.* Ithaca: Institute for Education and Research on Women and Work, New York State School of Industrial and Labor Relations, Cornell University, n.d.

Peterson, R. E., and associates. *Lifelong Learning in America.* San Francisco: Jossey-Bass, 1979.

Rubenson, K. *Participation in Recurrent Education.* Paris: Organization for Economic Cooperation and Development, 1977.

Scanlan, C. L., and Darkenwald, G. G. "Identifying Deterrents to Participation in Continuing Education." *Adult Education Quarterly* 34, no. 3 (Spring 1984): 155-166. (ERIC No. EJ 296 374).

Seaman, D. F., and Schroeder, W. L. "The Relationship between Extent of Educative Behavior by Adults and Their Attitudes toward Continuing Education." *Adult Education Quarterly* 20, no. 2 (Winter 1970): 99-105. (ERIC No. EJ 018 121).

Shore, Jane. *The Education Fund of District Council 37: A Case Study.* Washington, DC: National Institute for Work and Learning, 1979. (ERIC Document Reproduction Service No. ED 200 730).

Shy, A. "The Displaced Worker Problem and Implications for Training and Education Institutions." In *Displaced Workers: Implications for Educational and Training Institutions,* edited by Kevin Hollenbeck, et al. Columbus: The National Center for Research in Vocational Education, The Ohio State University, 1984. (ERIC Document Reproduction Service No. ED 245 081).

Smith, D. A. *An Overview of Training in the Public Sector.* Arlington, VA: Analytic Sciences, Inc., 1979. (ERIC Document Reproduction Service No. ED 190 779).

Stewart, C. D. *Worklife Education and Training and the Ordeal of Change.* Washington, DC: National Institute for Work and Learning, 1980. (ERIC Document Reproduction Service No. ED 200 722).

Taber, Thomas D.; Walsh, Jeffery T.; and Cooke, Robert. "Developing a Community-Based Program for Reducing the Social Impact of a Plant Closing." *Journal of Applied Behavioral Science* 15 (1979): 133-155.

Tough, Allan M. *The Adult's Learning Projects: A Fresh Approach to Theory and Practice in Adult Learning.* Toronto: Ontario Institute for Studies in Education, 1971.

U.S. Department of Defense. *Military Manpower Training Report for FY 1982.* Washington, DC: U.S. Department of Defense, 1981.

U.S. Department of Labor. ***Plant Closing Checklist: A Guide to Best Practice.*** Washington, DC: Bureau of Labor-Management Relations and Cooperative Programs, U.S. Department of Labor, 1985.

U.S. Office of Personnel Management. "Employee Training in the Federal Service: Fiscal Year 1979." Unpublished report, 1979.

Veterans Administration. ***1980 Annual Report--Our 50th Anniversary.*** Washington, DC: Veterans Administration, 1981.

Vinokur, Amiram, and Caplan, Robert D. "Attitudes and Social Support: Determinants of Job-Seeking Behavior and Well-Being among the Unemployed." ***Journal of Applied Social Psychology*** 16 (May 1986).

Wilcox, J.; Saltford, R. A.; and Veres, H. C. ***Continuing Education: Bridging the Information Gap.*** Ithaca, NY: Institute for Research and Development in Occupational Education, Cornell University, 1975. (ERIC Document Reproduction Service No. ED 137 502).

Wilms, W. W. ***The Effectiveness of Public and Proprietary Occupational Training.*** Prepared for the National Institute of Education, 1974.

Wlodkowski, R. J. ***Enhancing Adult Motivation to Learn.*** San Francisco: Jossey-Bass, 1985.